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FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

Volume . . . IX
Number . . . 12

DECEMBER . . 1934

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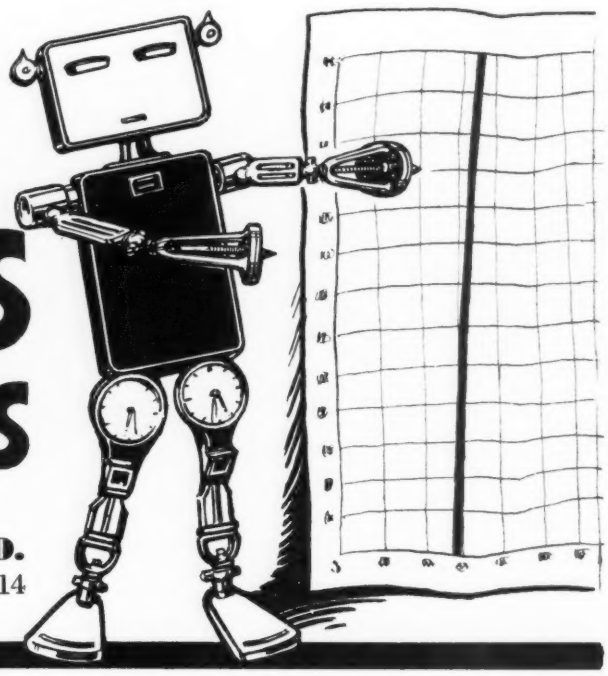

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FOOD MANUFACTURE

Vol. IX, No. 12 December, 1934

Canning Convention

NOW THAT the Fruit Show and Canning Exhibition, held at the beginning of November in Leicester, is over, canners back at their canneries and growers in their orchards are ruminating on their experiences and trying to make up their minds as to whether such affairs are good, bad, or indifferent from business, social, and educational points of view.

It is not for us to enter into this conflict, which is a matter for the individual to decide for himself. That there is, in fact, a marked conflict of opinions on the Leicester Exhibition is shown by the views expressed by stand-holders, which were published in *Food Industries Weekly*. These range from a "wash-out" to "remarkably successful", and, without making a fairly complete analysis, it would be folly to try to guess the result. The point we wish to make is that the fact that a wide divergency of opinion exists proves that there is room—probably much room—for improvement. This opens the way for constructive criticism and useful suggestions, but these again we leave to our readers, and content ourselves with recording one or two passing thoughts.

Dawn!

Those who were present can best assess the Exhibition's value as a business proposition. Everybody seemed quite happy about the social amenities. The only criticism we have to offer is that these might be a little more constrained without, however, being shackled. Exuberance at dawn is all very well for the farmyard, but is apt to be a little too dramatic, even for a Grand Hotel. But on the question of satisfying the mental appetite, a consensus of opinion indicated the provision of very meagre fare. It must, however, be admitted that there are two sides to this. From the public's point of view there can be no complaint about the educational value of the exhibits; the only thing is that Mr. Ponsford's exhibit of a canning line at work was not shown off to the best advantage. As an engineering job it was excellent, but it lost much by poor arrangements for conveying to sightseers the necessary information to enable them to follow clearly the sequence of operations. There was a lack of labels, loud-voiced explanations and inspection facilities.

Ignorance

This Ponsfordian Exhibit might well be preserved and shown all round the country. It would do much to dispel the dregs of canned foods suspicion which still contaminate large sections of the public. "I have been astonished", said Chemist Horner, in charge of the Campden Research Station stand, "at the ignorance of the public. Many people still imagine that some sort of preservative is added to canned foods, and there is still a vague idea that some mysterious jiggery-pokery goes on inside a cannery."

Vitamin Research

Campden, by the way, made a prominent feature of exhibits stressing the vitamin value of canned foods. That is another aspect of the campaign of enlightenment and a very important one too. It is a point that Director Hirst, at a conference on Co-operation in Sales Efforts, brought up for the serious consideration of canners. Dr. Kohman and his associates long ago saw the necessity for impressing the medical profession by conducting extensive researches on the vitamin content of canned foods. But American results, however elaborate and reliable they may be, are not likely to have the same weight as home-produced results in making an impression upon the somewhat conservative mind of the medical practitioner. Therefore, pleads Mr. Hirst, let us have our own investigations carried out. And to this admirable suggestion one might add that there would seem to us to be no more fit-

ting scene of operations for this than the Campden Station itself.

Vitamins in Canned Foods

At the Exhibition one learned that canned peas are much richer than orange juice in vitamin C, and that they are an excellent source of vitamin B. Canned peas, spinach and strawberries are all rich sources of vitamin C. Dr. Plimmer says: "Canned fruits and vegetables, if prepared with certain precautions, are equivalent in vitamin C value to the fresh material."

But these are mere generalities which will go no further than to evoke a sceptical smile among the medicals. Nothing short of unassailable evidence will satisfy them. So why not get on with the job?

Canner Interest

Reverting to the Exhibition arrangements, one is inclined to wonder if the "canner interest"—as one might term it—has not reached saturation value. A few years ago potential and incipient canners were consumed with curiosity to see a cooker, an exhaust box, or a seamer, and would travel miles to educate themselves on this score, but now they are all "wise" and there are but few of the "potential" sort in the offing, so that displays of plant and machinery, especially when mixed up with matters of general public interest, are not likely to have the same drawing power and educational value so far as they—the canners—are concerned. However, this is a point upon which theorising has to make way for facts and figures in the shape of the amount of business done, and it is therefore a point which is definitely determined one way or the other by the order books.

One interesting question does, however, arise out of this. Is the Exhibition plus Convention in danger of falling between two stools—public interest and canner interest—thus losing much of its effectiveness? Should not these two aims be taken separately?

The Welsh Experiment

Perhaps the most interesting part of the conference which was held in connection with the Leicester Exhibition was when Sir Edgar R. Jones, K.B.E., related the story of the spectacular sales campaign for British canned goods which he conducted in a certain district in South Wales. The district was divided up into areas, and each tinplate maker personally canvassed ten shops. The shop windows and counters were exclusively devoted to English packed foods—fruits, vegetables, fish, milk, soups, and so on. Prizes were arranged. This was all synchronised to take place during a particular fortnight. Such a campaign needs months of careful planning. Three-quarters of a million people were tackled in this way, and it is a population which eats a lot of canned goods. It was a mass effect, and was very striking and compelled extraordinary interest. Fruit and vegetables were to the front of the picture.

Sir Edgar personally visited many of these shops. He was amazed at the ignorance of the grocer as to the availability of the variety of English goods. He was deeply impressed with the success of the experiment. Many grocers were enthusiastic, and he found that even hosiers and drapers joined in the window displays.

The Message

Thus, his message is: "I am convinced that a personal campaign of this kind—backed up by local advertisements and travellers—is extraordinarily effective in breaking down the old drift of mind among the grocers. This experiment is worth repeating. Why not take another locality, with the co-operation of the fruit growers and farmers who are vitally interested?"

No agreement was reached as to the advisability of repeating this experiment, as there were some who thought that a campaign of this nature should take on a less nebulous and more scientific character by being based on an analysis of the consumers' attitude towards canned goods—and especially British produced—and by being conducted in a manner calculated to furnish definite data.

Wanted, A Weighing Machine

At the conference on factory equipment and conditions, opened by Mr. Goaman of the Ministry of Agriculture, Mr. Gregson drew attention to the need felt by the canning industry for an automatic weighing machine to deal with a continuous output of cans at, say, 50 a minute. This led to an interesting discussion on weight variations and tolerances in canned fruits. Representatives of engineering firms who were present assured the meeting that such a machine was within their power to design and construct.

Testing Thickness of Tin Coatings

The International Tin Research and Development Council has issued as Technical Publication,

Series A, No. 12, a reprint of a paper by Dr. S. G. Clarke, published in *The Analyst*, which describes a new rapid method of determining the thickness of a tin coating on steel. The procedure is simple. The tin is dissolved from a known area by a cold solution of hydrochloric acid and antimony chloride, and its amount is determined by the loss of weight of the specimen. The basis metal is unattacked, but a small correction has to be applied to allow for the layer of tin-iron alloy. In addition to brevity, the method has the advantage that the thickness of tin on a given portion of the surface can be determined, by protecting the remainder with a coating of cellulose varnish.

Agricultural Research

The first report of the Agricultural Research Council, which was presented to Parliament on November 3, covers proceedings from July, 1931, to September, 1933. The Council's functions are both administrative and advisory. It controls a grant made periodically from the Development Fund for the initiation or encouragement of special researches, and also advises the Ministry of Agriculture, the Department of Agriculture for Scotland, and the Development Commission on the scientific aspects of the agricultural work going on in research institutes and elsewhere at a total cost to the State of nearly £400,000 in 1931. The report under discussion recalls that when the Council was established it was intended that the research work of the various institutes should gradually be developed and increased under the superintendence of the new Council. But before it could begin its work the financial crisis intervened, and it was clear that no additional expenditure could be contemplated; in fact, economies in existing expenditure had to be effected.

What Has Been Done

The first task was to examine work in progress at different research centres. In the two years under review visits were paid to twenty-two research institutes by the six standing committees set up by the Council. Sometimes these were followed by visits of special sub-committees, which included eminent experts from outside the Council. In this way a good deal of spade work has been done in the way of linking up and correlating the work done in different centres. Special inquiries have also been undertaken and reports have been presented to Government Departments on matters requiring immediate attention.

Foot and Mouth Disease

Foremost among these was a special inquiry on the past history and future prospects of the research on foot and mouth disease, which for the last ten years has been carried on under the direction of a committee of the Ministry of Agriculture. The investigatory committee reported that excellent work, resulting in definite advances, has been done. It cannot, unfortunately, be said that any preventive measures for this scourge—such as an effective vaccine—are likely to be discovered at once, but it is considered that work in hand and results already obtained give definite hopes for a future solution on these lines.

Other Diseases

A review is also given of the research into the causes and prevention of animal diseases in general conducted in the last thirty years. The Council decided that at present the most urgent subject for enquiry for the economic benefit of the British farmer was that of animal disease. Until the last few years this work has not been carried on so actively in this country as elsewhere owing to lack of funds and sufficiently equipped laboratories. Special reference is made to the research on tuberculosis, Johne's disease, contagious abortion, mastitis, and poultry diseases. The council has decided that the first step in extending research is to make sure of plenty of well-trained recruits. It is hoped to get these by improving the veterinary colleges and then offering studentships, and out of its own very limited resources the Council decided to award studentships in animal health.

An Art; Not a Science

The report concludes by pointing out that agriculture is an art and not a science, and modern agriculture—like any other industry—must adapt the new discoveries and inventions of science to its own special ends. The sciences concerned in agriculture are developing rapidly, and constantly adding to agricultural knowledge—and at the same time the art of practical farming is changing with equal rapidity. The idea that success in farming depends on long experience handed on from generation to generation is erroneous. It is changing so fast that experience of past methods is less useful than knowledge of new ones and the mental adaptability and courage necessary to try them. The Agricultural Research Council is doing much to

organise agricultural science and so to assist practical farming to the fullest degree. We hope its efforts will be crowned with abundant success.

Public Health Congress

Last week we dropped into one of the conference rooms at the Public Health Exhibition and Congress, which was being held at the Royal Agricultural Hall, to listen to the views of various authorities on the thorny subject of Food Standards and the recent Report of the Departmental Committee on the Composition and Description of Foods.

Here are some of the main points made by the speakers:

Dr. Savage

The County Medical Officer of Health for Somerset is in agreement with the Departmental Committee that a comprehensive system of definitions and standards, perhaps ultimately to embrace all articles of food, is neither practicable nor desirable. Many foods are extremely complex and the definitions must be equally complex, and, moreover, they would be most difficult to enforce legally. Indeed, some constituents in foods are not capable of being defined in the sense of legal standards, for example, vitamins. At the same time, Dr. Savage is strongly in favour of an extension of definition for many articles. He also considers that all food manufacturing premises should be registered and open to inspection and sampling by the appropriate authority, as being the only satisfactory way to control the purity of manufacture. All prepacked foods should be dated, and the present position of labelling is unsatisfactory.

Dr. Lampitt

Dr. Lampitt is fundamentally against the multiplication of laws and regulations. Manufacturers must object to the control of manufacture as a means of maintaining certain standards. The alternative is control by scientific tests of the finished goods. This, he is convinced, is the fair method, and consequently any standards must be capable of accurate definition and their observance verified by scientific methods. To-day confusion exists not only in the interpretation of the Law by unqualified individuals, but also in the lack of accepted methods of analysis. Consequently, if more standards were set, confusion would be confounded, unless concurrently agreed methods of verification were established. Briefly, Dr. Lampitt's opinions are that bureaucratic control tends to engender rules and regulations for the sake of rules and regulations, that the general standard of purity of food in this country is very high, that control of standards might conveniently be established for a restricted range of products, and that verification of such standards must be by means of accepted methods of scientific examination.

Mr. Mathieson

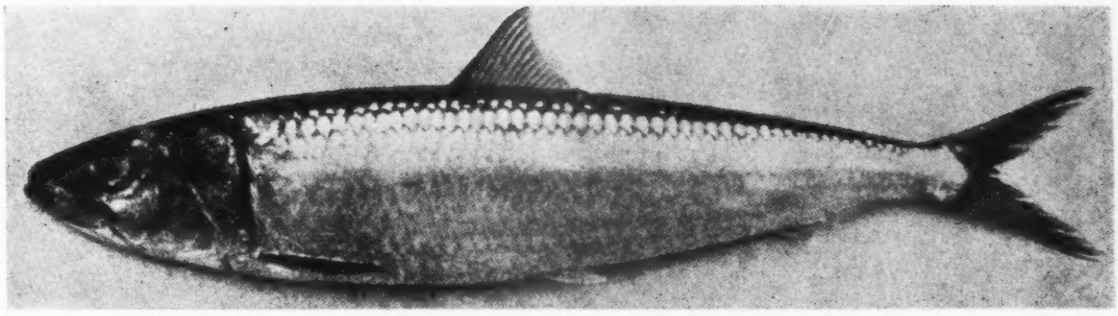
The President of the British Association of Research for the Cocoa, Chocolate, Sugar, Confectionery, and Jam Trades pointed out that manufacturers generally deprecate very strongly indeed the fixing of any standards, positive or negative, which are of such a nature that they cannot be checked with absolute certainty by methods of analysis. He thinks that the Departmental Committee is wise when it suggests that we shall do well to hasten slowly and not rush into a hard and fast system of standardisation applicable to every variety of foodstuff, regardless of whether there is really any important end to be achieved.

Mr. John Evans

The President of the Society of Public Analysts emphasised the point that any standards which may be adopted should not have the effect of preventing the sale to the public of perfectly wholesome but cheap products in substitution of more expensive ones. At the conclusion of his address he expressed the view that after so many years of pressing for the establishment of definitions and standards for certain foods we can now look forward with hope towards a time when the consumer will have the benefit of knowing what he expects to get in return for his money, and the analyst will have the satisfaction of being able to see that he gets it.

The Final Note

The final note upon which Mr. Evans concluded the Public Health Congress might well serve our own purpose in rounding off 1934 and opening up the vista of another year's progress and success, with this difference, that it will be the *manufacturer* who will have the satisfaction of being able to see that the consumer gets full value for his money. May this be the hope and aspiration of every food manufacturer for the New Year, as, indeed, we feel sure it has always been.



SARDINE CANNING IN CALIFORNIA

By R. S. Croker
(California State Fisheries Laboratory).

CALIFORNIA SARDINE canning methods have undergone considerable changes during the last five years. Until recently it was the universal practice to fry the sardines in tanks of cotton seed oil before placing them in the cans. The oil fry resulted in an excellent pack when the oil was fresh, but after a few hours' use it became stale and impregnated with the oil that cooked out of the fish themselves. Thus the major part of a day's run consisted of sardines cooked in virtual fish oil. These fish were sometimes bitter and invariably caused an "after-taste". The product was suitable for export to certain markets, but the domestic and higher class foreign trade would have nothing to do with it. Due to the recent curtailment of export markets, it became necessary for the canners to experiment with cooking methods that would make the California sardine acceptable to the American housewife. During the last few seasons several suitable ways of replacing the oil fry have been evolved, so that at present the sardine as packed in California is a quality product.

The canning of sardines (*Sardina cærulea*) is carried on at four points in California: Monterey, San Pedro-Long Beach, San Francisco Bay, and San Diego. The latter place specialises in a fancy pack of small sardines in ¼-lb. square cans. The other centres pack on a much larger scale, using adult sardines, 8 to 12 inches long, and employing a great variety of can sizes and shapes. The familiar 1-lb. oval can early became a favourite and is still the most popular container. Recently, however, three sizes of round cans have been gaining favour. The 1-lb. tall can has come into use as a competitor of salmon and mackerel, and the 5-oz. and 12-oz. tall cans are increasing in popularity; ½-lb. oval cans, ½-lb. square tins, 1-lb. flats, and a few other sizes are also used to some extent.

The following description of packing methods concerns itself principally with conditions in effect at San Pedro during the 1933-1934 season. Similar methods are in use at Monterey and San Francisco. The description of "quarter-oil" canning deals with methods in use at San Diego in 1933. The canning season at San Francisco and Monterey extends from August 1 to February 15. At San Pedro canning is carried on from November 1 to March 31. Small sardines are packed at San Diego principally during March, April, and May, although the quarter-oil canning season is variable and not limited by law, as are the seasons for adult sardines.

Although there are a great many variations in method, the general process of canning sardines can be described briefly as follows: The fish are beheaded, cleaned, packed raw in cans by hand, and given a steam cook in the open cans. The lids are then sealed, the cans washed and given a final cook in retorts. The following pages discuss details and variations of the process.

Arrival of Sardines at Cannery

Fishing for California sardines is carried on from 3 to 100 miles from the canneries. As soon as a boat has secured its load, it returns to port. All sardines used for canning are unloaded at the cannery within 12 hours of being caught; sometimes a few of the fish are still alive when delivered.

A series of hoists and flumes carries the sardines from the boat to cannery

This account of the sardine canning methods employed in California has very kindly been prepared at our special request by Mr. Richard S. Croker, of the California State Fisheries Laboratory. This material appears as Contribution No. 143 from the California State Fisheries Laboratory (California Division of Fish and Game), October, 1934.

It should be noted that the fish known as "sardine" in California is commonly called "pilchard" in England. That shown at the head of this page is a specimen of the San Pedro Sardine.

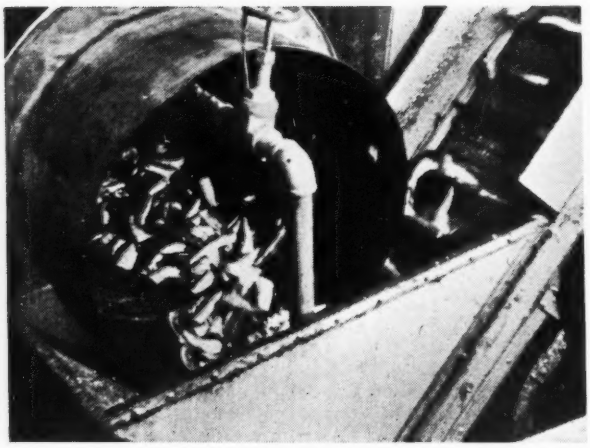


FIG. 1.—Scaling Machine in a California Sardine Cannery.
The cut fish pass through the inclined revolving drum which removes scales and particles of viscera. The pipe is perforated so that streams of water play on the fish. The conveyor at the right carries the fish to the packing room.

tanks, containing salt water. In some canneries the sardines pass through a "scaling machine" on the way to the tanks. This device consists of a large revolving drum or cylinder made of square wire mesh. The fish enter one end of the drum, which is inclined slightly, and are carried to the other end by gravity. During their passage through the cylinder, they are rolled against the wire and each other continually and are subjected to streams of water from a series of jets. As their scales are but loosely fastened, the fish are fairly well scaled by this operation. In all canneries the fish pass through a scaler after being cleaned, regardless of whether they have gone through one when they first entered the plant (see Fig. 1).

The holding tanks are equipped with several gates along one side at the bottom. The men in charge of the tanks can open these gates and flush the sardines through flumes to the cleaning tables or cutting machines.

Cutting and Cleaning

At some canneries the sardines are cut and cleaned by hand, in others by machinery, and in a few some of the sardines are cut by hand and some by machine. The fish are all cleaned the same way, regardless of what style pack they are intended for. However, those destined for small cans are cut shorter than those for the 1-lb. cans.

The cutting room of a cannery where the sardines are prepared entirely by hand presents an interesting sight. The holding tank, which is several feet above the floor, extends almost the entire length of the room. Adjacent to it, on the floor, is a row of cutting tables. Six to ten men or women work at each table, standing along both sides (see Fig. 2). Most of the cutters are Japanese or Filipinos. In the middle of each table and extending its entire length is a trough. The tank man keeps this trough filled with sardines by opening a gate on the tank from time to time. Along either side of the table is a wide board upon which the workers cut the fish after removing them from the trough.

The cutter uses a fairly dull knife. First he severs the head, and then before the cut is quite completed he pushes the head away from the body with his knife. This pushing motion carries most of the viscera away with the head. He then places the front end of the fish against a small upright board, which is in front of him on the table, and cuts off the tail a given distance from the board, depending upon what size can is being used. Sometimes the tails are left on the fish which are to go into oval cans. The first cut has been made far enough behind the head to eliminate most of the intestines and the remainder are pulled away with the head. Usually parts of the gonads (ovary or testis) remain in the fish, but as these are edible no harm results from leaving them.

At intervals along the cutting board there are holes connecting with a flume that leads to the "fertiliser" plant in another part of the cannery. Into these holes the cutters push the heads, tails, viscera, and all soft or otherwise unsuitable fish. The offal is manufactured into meal and oil, which are valuable by-products.

At some canneries the cutters are paid on a time basis, and at others they are paid according to the number of fish they cut. The piece-workers have boxes which they fill with cut fish and carry to a checker, who inspects the sardines and punches the cutter's piece-work card (see

FIG. 2.—Cutting and Cleaning California Sardines by Hand.
The worker in the foreground is carrying prepared fish to the flume which leads to the packing room. Note the piece-work cards carried by the cutters.

Fig. 2). The checker dumps the fish into a flume that leads to the scaler. The cutters who work by the hour place the fish they have cleaned into a flume, which carries them to the scaler. This machine is similar to the one mentioned above (see Fig. 1). It removes practically all of the remaining scales and the bits of viscera that adhere to the fish. The sardines are now ready for canning and are carried on a belt conveyor to the packing room.

The cutting machines used in other canneries are strikingly different in appearance from the hand-cutting tables, although they perform the same work. The machines, eight or more in number, depending upon the size of the cannery, are located along the base of the holding tank. Four women, usually Japanese, work at each machine. The women's job is to place the sardines in the machine which does the cutting. In front of the two women who stand on one side is a trough into which the man on the tank sluices the whole sardines. At some machines, as the one shown in Fig. 3, one of the women operates the gate lever. Just beyond the trough there is a moving belt with grooves into which the women place the sardines they take from the trough. The belt carries the fish under a pair of rotary knives, one of which severs the head and the other removes the tail. As indicated by the position of the slit in the belt shown in Fig. 3, the head cut is made some little distance posterior to the head. Each machine is in duplicate—that is, it has two troughs, two parallel belts, and two pairs of knives. The severed heads fall into a flume, carrying most of the viscera with them. The tails fall into the same flume, which leads to the fertiliser room. The bodies drop on to a belt conveyor, which carries them to the scaler and thence to the packing room.

If there is anything to choose between the two methods of cutting as far as quality of output is concerned, it may be said that the hand cleaners remove the viscera a trifle more thoroughly, but that the cuts made by the machine are somewhat neater and the resulting pieces are more uniform in length.

At least one of the Northern California canneries employs vacuum type cleaning machines, which are a recent development. Hand labour is reduced to a minimum. The sardines pass through this machine with great rapidity and emerge with the heads and tails cut off and the viscera removed by suction.

At another northern cannery, a rotating drill is used to remove the viscera after the heads are severed. The automatic drill is inserted into the visceral cavity with a twisting motion that cuts the intestines loose from the body. A stream of water running through the centre of the drill washes out all the loose material. This type of cleaning machine, which is patented by the cannery, is said to be the most efficient in use at present.

Once the sardines are cut and cleaned, further processes differ from plant to plant and with the different types of pack.

Packing One-Pound Ovals

It must be noted at the outset that no two canneries employ exactly the same practices in packing and cooking. At nearly all canneries the sardines are given a "precook" before the cans are sealed, although the first cooking is not necessary for the "vacuum pack". Departures from the general method will be taken up at the conclusion of the following description of a typical "precook pack".

FIG. 3.—Looking down on a Sardine Cutting Machine. The belt carries the fish under a battery of rotary knives. The fish storage tanks are to the left of the woman in the foreground.

The sardines go from the cutting room to "brine tanks" in or near the packing room. These tanks contain salt water in which the fish are kept until needed by the packers. Fresh water would soften the fish. The purpose of the tanks is to provide a surplus of cut sardines so that a steady supply is available to the packers.

In the packing room are one or more long tables at which women workers fill the cans by hand. Down the middle of each table runs a belt conveyor that carries the sardines from the brine tanks to the workers. The women can divert the stream of fish from the belt to the table as needed. In some plants the fish are dipped from the tanks and placed in shallow wire baskets, which are carried to the packers by a conveyor (see Fig. 4). In some canneries where it would be difficult to install conveyors, men carry the baskets of fish to the packers.

At some plants the empty cans come to the packers on belt conveyors running either above or below the belt that carries the fish (see Fig. 4). In other canneries men bring the empty cans to the table in boxes which are placed alongside the packers.

The women packers are of all nationalities and are

FIG. 4.—Packing Sardines in Oval Cans.
The pieces of fish come to the workers in the wire baskets above the table.

often the wives or other relatives of the fishermen. They, as well as the other cannery workers, also work on tuna and mackerel when those fish are being canned at the same plant.

The women work with great speed, albeit carefully, as they place the fish in the can, belly up, alternating ends so as to fill the can to the best advantage. It is the custom to arrange the fish in one layer, 5 or 6 to the can, depending upon the size of the sardines. At present the minimum number of fish per can is 4 and the maximum is 8. The packer places the filled cans on a platform above the table (see Fig. 4) until she has a specified number, usually 12 or 15. A checker inspects the cans, punches the packer's piece-work card and releases the cans on to a belt conveyor that carries them to the cooker. Before the cans reach the cooker, however, they have to pass the scrutiny of inspectors, who cut off loose pieces and reject overfilled or underfilled cans. Balance scales are sometimes used by packers or inspectors to make sure of the weight of doubtful cans.

Precooking

The precooker is known as an exhaust box. It consists of an enclosed steam chamber, the length of which runs a belt conveyor to carry the cans. This conveyor winds back and forth in the cooker so that the cans make several circuits before emerging. Both ends of the exhaust box are open so that the cans can enter and leave. Live steam, under no pressure, heats the exhaust box to about 210° F. The cans take 20 to 35 minutes to pass through the cooker, the times varying at different canneries. In the exhaust box some of the moisture is cooked out of the fish, and the vacant spaces in the can become filled with live steam, which condenses when the can cools after being sealed, and causes a vacuum. At the conclusion of the steam cook the cans are inverted in order to drain off the moisture that has been cooked out of the fish. The conveyor makes a loop to tip the cans.

Saucing and Closing

The cans now pass under the sauce machine, which automatically inserts approximately 2 oz. of either tomato sauce or mustard sauce, as the case may be, into each can (see Fig. 5). The greater part of the pack is put up with tomato sauce. Each conveyor leads to a closing machine where the lids are put on the cans and sealed. Fig. 6 shows a row of closing machines in operation. Another belt conveyor carries the sealed cans to a vat of boiling water and lye wherein they are rinsed. Bits of fish may have gathered on the can, which also collects some grease while passing over the lubricated slide on the closing machine. Because of the awkward shape of the oval can, belt conveyors or greased gravity conveyors are necessary for carrying them from one place to another; the oval cans will not roll in an ordinary gravity conveyor like the round tins.

(*To be continued.*)

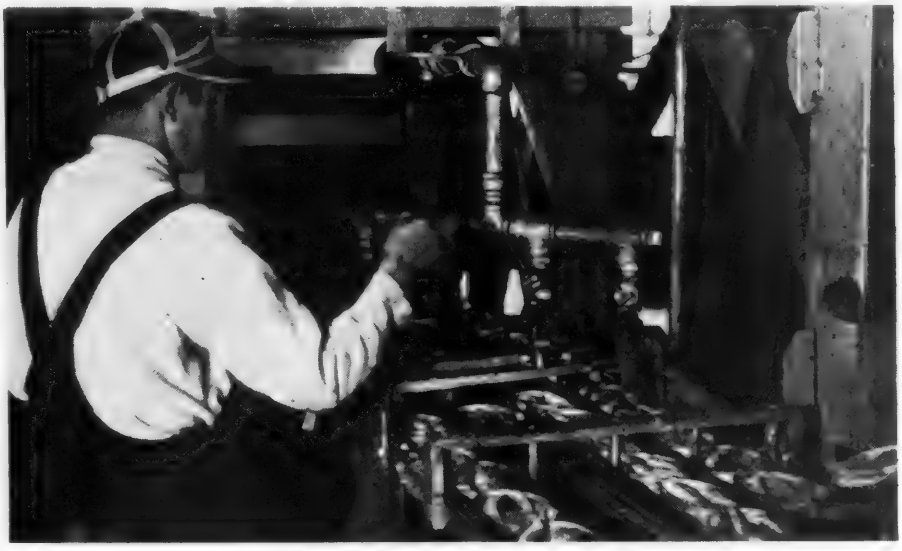


FIG. 5.—The Sauce Machine.
The open cans pass under the jets at a definite speed, which allows two ounces of tomato or mustard sauce to run into each can.

CENTRIFUGAL MACHINES

Their Use in the Food Industries

By R. W. Lamont

AS A quick and economical means of separating a crystalline or granular substance from its mother liquor, or for recovering a finely divided solid from a liquid, the centrifugal machine is without a rival. Probably there is no better illustration of its use than in the recovery of both cane sugar and beet sugar crystals from their mother liquor. The combined mass of crystals and molasses—known as massecuite—is fed into the centrifugal baskets while in motion, with the result that the crystals are freed from the molasses.

The baskets of the centrifugal machines have a perforated shell-plate or wall, but, in addition, are fitted with metallic linings which may be perforated or woven, to prevent crystals passing through the perforations of the basket with the molasses, and these linings are so arranged that the molasses are not impeded in making their escape. The recovered sugar crystals may also be steamed or washed while in the centrifugal machine, depending on the class of sugar being produced and the methods of manufacture being employed.

The output from any centrifugal machine depends very largely on the class of sugar being treated and the methods of production; the output also varies in different parts of the world, according to the nature of the sugar, some sugars being more easy to cure than others. The output is likewise dependent on the cycle of operations—*i.e.*, the time which may be taken to charge the centrifugal, to purge the sugar and to discharge the machine. It is possible with some sugars to have a two-minute cycle of operation with machines having baskets 48 in. in diameter and taking a charge of approximately 1,200 lb. of sugar.

Construction

For the sugar industry, black steel is commonly utilised for the construction of the baskets, and the three loose linings are generally as follows: One coarse iron gauze against the basket shell-plate; one medium brass gauze in the centre, and one fine copper gauze or finely perforated copper sheet inside the basket and next to the sugar being treated. This combination of screens eliminates electrolytic action between the copper lining and the steel basket, and considerably reduces corrosion of the basket shell-plate.

With the object of increasing output and reducing labour costs, designers have attempted to produce a machine in which the operations of charging and discharging the sugar would be continuous, so that there would be no need for an operator in the ordinary sense.

Some of these attempts to produce such a machine have been ingenious and complicated, but they have all failed so far as the sugar industry is concerned. The nearest satisfactory approach to a continuously operating centrifugal machine for sugar is the use of what is known as the self-discharging basket. Many years ago this machine was conceived and so designed that, when the centrifugal machine is stopped, the wall of sugar by its own weight falls through the central opening in the bottom of the basket on account of the angle of the bottom of the basket being made so steep that it would not support the sugar when centrifugal force is absent. It was found that this design of basket was eminently satisfactory for free-drying sugars and that it was particularly suitable for refinery work. The design is still the best substitute for a continuously operating centrifugal machine in the sugar industry, where the quality of

Broadbent Centrifuges fitted with special corrosion-resistant linings, for dealing with citrates and similar salts.

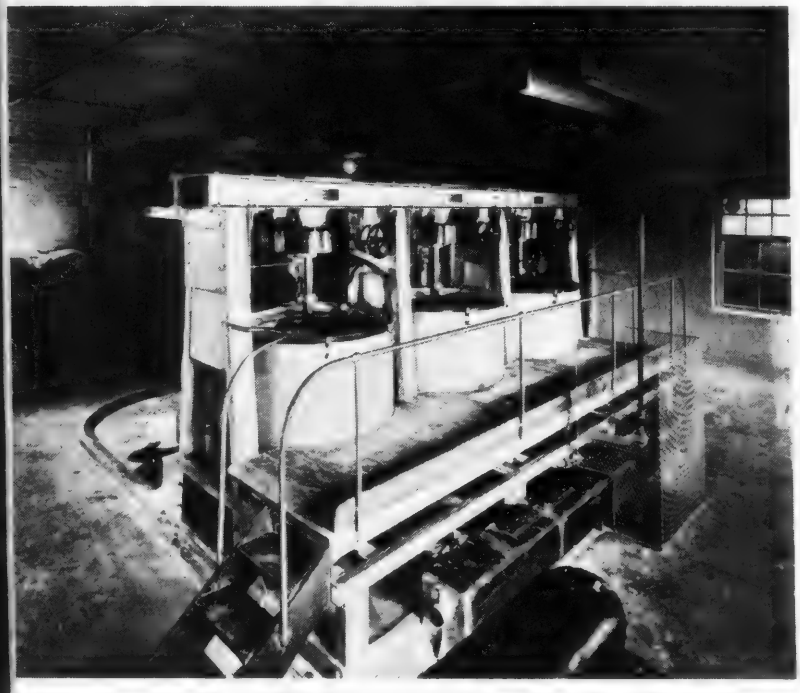
the sugar permits of its use. There is no doubt that this design of basket can be used with considerable advantage for many kinds of free-drying crystalline or granular materials, and the output from it is very much greater than from a centrifugal machine of ordinary design of the same diameter of basket, with saving in time and labour.

As a means of increasing the output of ordinary baskets, ploughs or mechanical unloaders have sometimes been used for quickly discharging the sugar after curing, but their use largely depends upon the quality of the sugar. Where such ploughs are used, it is necessary to have definite provision for running the centrifugal at two speeds, namely, a high speed for curing and a low speed for discharging by the plough.

Other Applications

There are many other materials besides sugar which can be treated quickly and economically in centrifugal machines, where crystals have to be recovered from their mother liquor, solids recovered from liquors, liquids separated from solids, liquors clarified by the removal of a fine solid, or liquids of different specific gravities separated.

The drying of suitable crystalline or granular materials is comparatively simple, and the time of treatment in the centrifugal machine is generally short. With many other products the problem is more difficult, and, in some cases, it is necessary to make actual tests to determine what results will be obtained. Occasionally the centrifugal machine may be used with advantage as a preliminary drier or separator, thus quickly and economically removing the bulk of the liquor or moisture, the remainder of the drying process being completed in some form of heated drier. By this means the time treatment in the heated drier is considerably reduced, with corresponding economies, because the mechanical drying performed in the centrifugal machine is less costly. It might be very misleading to attempt to give percentages of drying efficiency, because conditions vary so much with the same product under different working conditions. There are many operating conditions to be considered, such as the speed of the basket, the rate of feed, the amount of charge, the length of time the centrifugal should be run, the kind of lining which should be fitted to the basket, whether the basket should be charged while at rest or while in motion, and other conditions which can only be settled by actual test, unless sufficient data are already available.



Three 48″×24″ electrically driven Centrifugal Machines made by Messrs. Watson, Laidlaw and Co., Ltd., for Messrs. William Wotherspoon, Ltd., manufacturers of cornflour and starch.

Food Products

As an indication of the great diversity of food products which may be treated in centrifugal machines, the following may be instanced.

In the manufacture of sausages, bread soaked in water is treated in a centrifugal machine to produce the necessary consistency and dryness required. Coffee essence may be improved and clarified by treatment in centrifugal machines to remove the grounds. Such other well-known products as malted milk, pickles, health salts, cod liver oil, fish residues, marmalades and jams, fruit juices, citric acid, potato crisps, meat extracts, wines, glycerine, cocoa, coffee, tea, nuts, oil "foots", salt, starch, tapioca flour, tartaric acid, brewers' sugar, etc., are subject to treatment in a centrifugal machine at some point in the course of their manufacture. For the elimination of waste, such as the recovery of albumen from egg shells, the use of a small centrifugal is quick and profitable.

Frozen Eggs

An interesting application for centrifugal machines is in the treatment of foreign frozen eggs. These are imported in tins each containing about 44 lb. The shells are removed, and the yolks and whites of the eggs are put into tins, sealed up and frozen. On arrival in this country the tins containing the frozen eggs are immersed in hot water tanks at 80° C. for eight hours to thaw them. The contents are then emptied into a small-size centrifugal which blends the yolks and whites together, and the discharged liquor is then ready for confectionery purposes.

Finally, attention should be drawn to the very great importance in giving careful consideration to the choice of a suitable resistant metal for construction of the basket. Nickel, monel metal, aluminium, duralumin, and stainless steel are among the safest to use, but there are several considerations in addition to the nature of the food to be treated, such as the presence of impurities, which render it particularly desirable for a manufacturer to seek the advice of either the maker of the machine or an independent expert in deciding upon the most suitable metal for a particular purpose.

Improved Methods of
JELLY MANUFACTURE

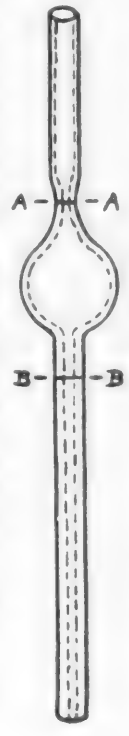
By George L. Baker

(Delaware Agricultural Experiment Station)*

IN THE United States we find regional preferences as regards a tart or mild flavoured jelly, and, in some degree, with regard to the strength or stiffness of the jelly. Some sections prefer a firm jelly that cuts very sharply with a knife and is used as a relish; others prefer a jelly that just barely stands, one which spreads very easily on bread or crackers. However, practically everywhere there is a demand for a clear, transparent jelly. Progressive manufacturers of fruit jelly products recognize these preferences, and are constantly seeking new ways of producing a better grade of jelly—a jelly of better colour, better physical properties, and better flavour.

Basis of a New Method

Methods[1] which are considered by those using them to be an improvement in the art of jelly manufacture, especially methods controlling physical properties and flavour, are being advocated by the Delaware Agricultural Experiment Station. The basis for these methods lies in the recently announced theory that viscosity is an index of the jellying quality of a fruit juice extract, provided that the *p*H is at an optimum for the jelly condition of the fruit considered. Since viscosity is an index of the jellying quality,[2] it can also be used as a control for the increase or decrease of effective pectin in accordance with the flavour and physical properties demanded.



For rapid check work a simple pipette which can be easily cleaned is shown. As previously described,[1] it consists merely of about four inches of capillary tubing (0·02 to 0·04 in.) sealed to a glass bulb of about 2 c.c. capacity. The time it takes for the juice to flow from an etched mark "A" above the bulb to another mark "B" on the capillary, divided by the time it takes for water to flow between the same marks, at the same temperature, gives the relative viscosity of the juice.

To illustrate the correlation of viscosity with jellying power the following table is presented:

* Approved by C. A. McCue, Director of the Delaware Agricultural Experiment Station.

Relative Viscosity.	*Parts Sugar to be Added for each Part of Juice.*	*Parts Final Weight for each Part of Juice.*
4	0·54	0·90
5	0·69	1·15
6	0·80	1·33
7	0·90	1·50
8	0·99	1·65
9	1·06	1·76
10	1·13	1·88
11	1·19	1·98
12	1·25	2·08
15	1·39	2·31

Calculating Weight of Sugar

Opposite each viscosity, as an index in their respective columns, appears the amount of sugar each part of juice should require and the amount of finished product. The percentage of sugar in the finished jelly will vary slightly according to the natural fruit sugars present in the juice. The final weight as given above is based on 60 per cent. added sugar. These values are for a very tender jelly, one which quivers and barely stands, testing between 20 and 30 on our jelly tester. The values for sugar added in the table appear as Curve A, in the figure on the next page, which conforms to the general empirical equation $\log y = ax + b$, where $a = 0{\cdot}675$ and $b = 0{\cdot}236$.

To obtain values for a jelly strength of 40, the value of the constant a should be increased to 0·833 and that of b lowered to 0·195. For a jelly strength of 50, the values of the constants a and b may be taken as 1·0 and 0·154 respectively. These values are plotted and appear on page 428 as Curve B and Curve C. A curve for the weight of jelly produced may be derived from a similar formula, $\log y = acx + b$, where a, b, and y are the same as in the above formula; x equals final weight of jelly per unit weight of juice, and c is a constant equal to the percentage of added sugar in the final jelly.

The constants given here are for our experimental kettles. The constants to be used will vary slightly with each manufacturer, depending on the size of kettles and cooking time employed. The formula constants a and b will vary slightly with any change made in the total soluble solids desired in the finished jelly, such as may be necessary with the various fruit juices. Each manufacturer may develop a curve of values to fit the type of jelly he wishes to produce. Once developed, the curve will hold for all stages of ripeness of a fruit.

Varying the Strength

At times the manufacturer may wish to vary the strength of his product. For instance, take the case of a manufacturer of guava jelly. He may have an order for a hundred or so pounds of jelly from a nearby town. He would use the following proportions if his juice had a viscosity of 7:

75 lb. of juice
67·5 ,, sugar (from Curve A or table)
12 oz. citric acid (50 per cent.)

The whole should be boiled rapidly in the weighed kettle to a final weight of 112·5 lb., run into the containers and sealed. The strength of the resulting jelly would be low.

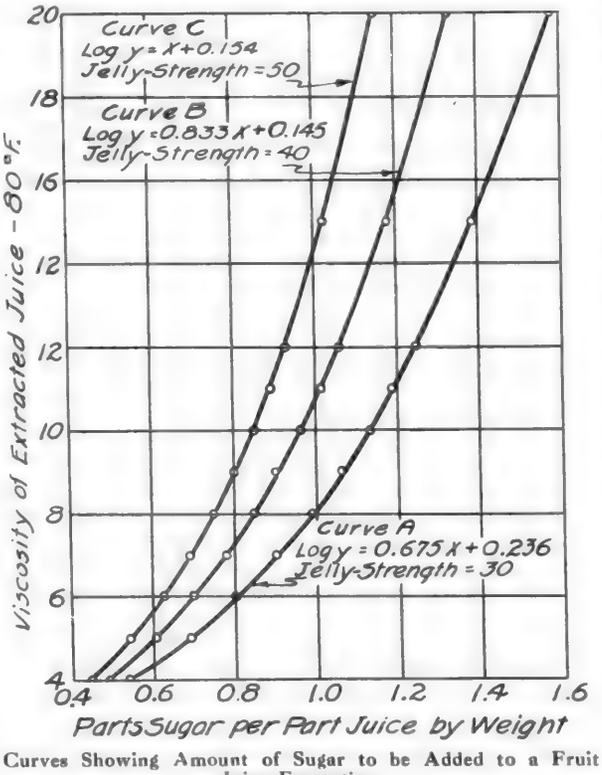
If now he had a similar order from a distant point, using the same juice, he would use the following proportions:

100 lb. juice
69 ,, sugar (from Curve C)
18 oz. citric acid (50 per cent.)

This lot should be boiled according to formula (60 per cent. added sugar) to a final weight of 115 lb., and put into containers for shipping. This lot would have a fairly high jelly strength and would thus be able to withstand shipping conditions satisfactorily.

It should here be noted that by having the kettle on scales, the weight of the batch is known at all times. Instead of taking the end-point of the cooking process by temperature or soluble solids content as measured by a refractometer, the end-point is taken accurately and without delay from the scales. When the predetermined weight is obtained the jelly is poured.

Manufacturers wish to vary their formulas according to the flavour of the juice rather than to add just the amount of sugar the juice will support. Where the viscosity is too high for the strength of jelly desired, the viscosity is reduced to a figure which will support the amount of sugar necessary to produce the best flavoured jelly. In other cases a commercial pectin is added so that the manufacturers can add more sugar to a highly flavoured juice. The strength of the product is thus kept standard by a check on the viscosity. Some of our manufacturers have learned that by proper methods of extraction they can develop flavours, and at the same time sufficient effective pectin, to support the sugar desired. But the subject of proper methods of extraction is much too complicated to be considered here.



Curves Showing Amount of Sugar to be Added to a Fruit Juice Extraction.

These curves can be used by the practical jelly maker thus: Suppose he has 80 lb. of extracted juice with a viscosity of 17. He follows the line opposite 17 across until it strikes the curve of the strength jelly he desires. At this point, he should follow the vertical line down to the bottom where he can read off the parts sugar per part juice (1·075 in this case) he should add. Then this value multiplied by pounds of juice he has ready for jelly making, 80 × 1·075 equals 86, the number of pounds of sugar he should add to get a firm jelly.

Adding Pectin

Before leaving the subject of adjustment of viscosity, let us consider the case of a manufacturer who obtains an extracted juice of viscosity 5 with a very strong flavour. He adds to such a juice a standard solution of very effective pectin to raise the viscosity to a higher figure, depending on what the flavour calls for. He not only betters the flavour of his resulting jelly by this move, but increases the yield and shortens the cooking time as well. This is shown by the following example: Juice with a viscosity of 5 requires 0·69 lb. of sugar per pound of juice and needs to be boiled to a final jelly weight of 1·15 lb. per pound of juice. That is, 0·54 lb. of water must be boiled off per pound of juice to obtain a jelly strength of 30. Now this product is a very highly flavoured, tart jelly. If pectin is added to this same juice, bringing the viscosity to a value of 12, every pound of juice will require 1·25 lb. of sugar, and will produce 2·08 lb. of jelly. In this case only 0·17 lb. of water per pound of juice need be boiled off to produce almost twice the quantity of a milder jelly in a shorter time, but having the same physical strength. Of course, this is an exaggerated illustration, and the proportion of fruit used must be kept up to the requirements of the accepted standards; a soluble solids determination on the juice before making up the jelly will probably be necessary.

Reducing the Viscosity

In cases where the manufacturer obtains a very high viscosity, as in apple extractions, in order not to obtain a very tough jelly, he reduces the viscosity before adding sugar. He may do this either by diluting the juice (if allowable) with a consequent dilution of flavour, or by heating the juice for a short period of time. The higher the hydrogen ion concentration, the more effective is this latter method. This action may be accelerated by the addition of a little acid. The idea is firmly im-

planted in the minds of many that by concentrating the juice by boiling, the concentration of pectin is increased, and thus there is a corresponding increase in jellying capacity. In fact, the opposite is true; the quality of the existing pectin is decreased,* so that the result is a lowered sugar holding capacity.

As a matter of fact, if the viscosity of an extracted juice is measured, there is obtained a direct index of the amount of effective pectin needed for a standard batch of jelly. In order to bring the viscosity of the batch to a point which equals the usual ratio of sugar to juice, it is possible to develop a table to conform to any specific conditions. This table may be consulted to find exactly how much pectin must be added in order to bring the viscosity to accepted standard values. For example: 10 gal. of juice of the same flavour will support the following amounts of sugar:

At viscosity	4,	45	lb.	of	sugar
,, ,,	8,	83	,,	,,	,,
,, ,,	10,	94	,,	,,	,,
,, ,,	12,	105	,,	,,	,,

Now, if the manufacturer is using 300 grade powdered pectin, when the viscosity is:

4	he must add	0·20	lb.
8	,, ,,	0·073	,,
10	,, ,,	0·036	,,

in order to obtain a jelly of the same flavour and strength as a viscosity of 12 produces. These values hold for all fruit juices if conditions of optimum *p*H are observed.

In like manner, the cooking time of each batch will be fairly uniform, the sugar added will be exactly the same, and the quantity of jelly made will also be the same.

Under the Preserver's Code pectin may be added to a fruit juice extraction in jelly manufacture, provided that the standard proportion of 50 lb. of sugar to 50 lb. of fruit or its equivalent in extracted juice be used. Figuring on the basis of a juice with 8 per cent. soluble solids, a finished jelly with a solids content of 65 per cent. can be obtained by adding the sugar on a basis of 60 per cent. added sugar in the final jelly. Therefore by adding 50 lb. of sugar you would expect 83·3 lb. of jelly. This, then, also corresponds to 50 lb. of fruit, or the equivalent in extracted juice.

Weight of Juice Employed

The fruit juice extracted from 50 lb. of fruit will necessarily be confined to certain limits of weight for the various viscosities obtained. For a viscosity of 13 the weight of juice employed must not exceed 40 lb., or else the final weight of jelly will exceed the 83·3 lb. limit allowed. These values are based on a 60 per cent. added sugar jelly with a final jelly strength of 30. For a viscosity of 10 the weight of juice must not exceed 45 lb., for a viscosity of 7 not more than 55 lb., and for a viscosity of 4 not more than 95 lb. of juice. Higher jelly strengths will allow higher limits, of course.

* On heating a pectin solution the pectin is depolymerised, the final product being pectic acid. This point is discussed in *Del. Agr. Exp. Sta. Bulletin No.* 187, *Tech. No.* 15.

As a rule, it is the practice to extract fruit juice for jelly making by crushing soft fruits, adding only a very small amount of water to the less juicy ones, and heating until the fruit is tender. When the juice is pressed out and strained it will easily fulfil the above conditions. However, fruits like the apple require more water to take care of their high pectin content, and can easily surpass these limits, especially at such a low jelly strength as 30.

Guava Jelly

These new methods have been successfully applied with various fruits; perhaps the first fruit jelly to which they were actually applied was the guava, a Florida fruit. It was the practice to store quantities of the extracted guava juice in bottles until needed. As orders came in, the juice was made into jelly and shipped out. This juice as bottled had a *p*H of about 3·7. Established formulas were used in making up the jelly, but it was not until viscosity and weight control were adopted that a uniform product was obtained. The juice from the bottles was found to vary from viscosities of slightly above 1, where the pectin was worthless, to values up to 10, a good grade of juice for jelly making. The guava jelly most acceptable to the public is light brown in colour, clear, and of a firm consistency (jelly strength 50).

Strawberry, Raspberry and Blackberry Jellies

Strawberries, unless very green, require acid in order to fulfil the requirements of the viscosity index. Our commercial strawberry jelly is generally a pectin jelly with strawberry as a flavour only. Red raspberries make a jelly, but are expensive to use alone. Blackberries, if slightly under-ripe, make excellent jelly by this method.

Currant Jelly

Currants, which are naturally easy to make jelly from, work very well by this method. Firm ripe currants, when crushed and extracted with water, using about 2 lb. of water to every 3 lb. of fruit, and boiling for about fifteen minutes, produce an extracted juice with a viscosity of 15 or above. As the fruit ripens, the water used in the extraction may be lessened in quantity or dispensed with entirely. If desired, a very dark red, highly flavoured jelly may be made from the over-ripe fruit.

Grape Jelly

This, which is always a favourite, becomes more attractive when the following method is used. The Concord variety is generally used for jelly making. Ripe grapes, stemmed, mashed, and heated just to boiling for about ten minutes, produce a juice with a viscosity of from 12 to 20. Chilling the juice down to about 40° C. and holding it at this temperature for 24 hours will cause the formation of a sufficient amount of cream of tartar crystals, so that when jellies are made up according to viscosity, crystals of cream of tartar will not form on standing. The removal of this bitartrate aids the forma-

(*Continued on page* 439.)

Carting Wheat by Bullock Team in Australia.

WHEATEN FLOUR
and its more important
CONSTITUENTS

By C. W. HERD,
Ph.D., B.Sc., F.I.C.

Part III—Conclusion*

Moisture Content of Flour

IT IS well known in all cereal laboratories that the "moisture content" of a flour will vary, dependent upon the method used in the determination. Thus the time and temperature of drying are factors determining the loss of moisture in any sample of flour. It was early evident that water was held by forces of different magnitude and possibly of different types. Kent-Jones has coined two terms to describe this effect; he refers to "moisture of wetness", which is easily removed, and "moisture of constitution", which obviously includes water that is partly combined chemically or physico-chemically with the other constituents of flour. Proteins and starch can form such combinations with water, and naturally the avidity of these ill-defined bodies for water will vary appreciably. Kent-Jones elaborates this difference more definitely thus: "One may consider that the moisture of wetness is simply the water which adheres to the surface of the flour particle, and as such the attraction is purely physical. Gentle heat will very quickly vaporise, disperse, and drive off this water, leaving the flour itself more or less unaltered". Then there is the moisture more closely connected with the constitution of the flour, which acts as water of hydration to the swollen protein particles, the gliadin and glutenin. . . . "Even with this water of hydration some will probably be united more closely with the actual protein nucleus than the remainder."

Fisher has studied some typical drying curves of flours and plotted the instantaneous rates of drying against the water contents. These are straight line relationships down to a water content of about 6·0 per cent. of a type represented by—

$$-\frac{dw}{dt} = k(w - c)$$

where c is the intercept on the horizontal axis which can be obtained on extrapolation. At 6·0 per cent. water a change in direction takes place, but the relationship remains a linear one down to a moisture content of 2·5 per cent. Below this a further change takes place, and Fisher says: "Below about 2·5 per cent. water content the rate curve bends round to the origin, drying becoming very slow. It is inferred that it is along this region that the really hygroscopic or sorbed water, or water that may perhaps be held chemically, is given off." These curves are of the same type as those obtained by Fisher in textile fabrics, soils, and clays. Apart from this work, very little is known about the combination of water with the various flour constituents, although it would appear probable that the chemical or physical combinations between water and starch and protein may be of very great significance in determining certain dough qualities.

Sugar

According to Kent-Jones' table, the quantity of sugar in flour is in the region of 2·5 per cent. Flour may contain dextrose, maltose, and cane sugar, and, of course, the main function of these sugars in bread making is that they form the food for the yeast during the fermentation of the dough. From the present viewpoint very little can be said about the nature of the sugars in the complex structure of the dough. If reference is made again to Swanson's colloidal picture of dough behaviour, it is seen that the sugars are believed to be molecularly dispersed in the water medium, and thus they may not enter into the other continuous phase—namely, the gluten meshwork.

Amylolytic Enzymes

Closely associated with the sugars originally present in the flour are, of course, the amylolytic enzymes. These

* See October issue.

function necessarily in the conversion of part of the starch into the sugars, thus making a sufficiency for the yeast to work on during the fermentation period. How does this action take place in our complex system? Again the answer cannot be given; the normal action of diastase is known to be in two stages—namely, in the first place the breaking down or liquefying of the starch granule to give soluble starch, followed by the conversion of the soluble starch into the sugar maltose. Perhaps it may be imagined that the action takes place in the aqueous phase of the dough complex; it is most unlikely to be associated with the gluten fibrils, although if the starch granules are enclosed in the "mesh-network" of the gluten, then there must be considered how contact can be made between the enzymes and the starch. The varying resistances of the starches in different flours has already been considered; obviously the amount of sugar produced during fermentation will depend upon the amount or activity of the diastase, the resistance of the starch to enzymic attack, and the contact between the starch and the enzyme.

Proteolysis

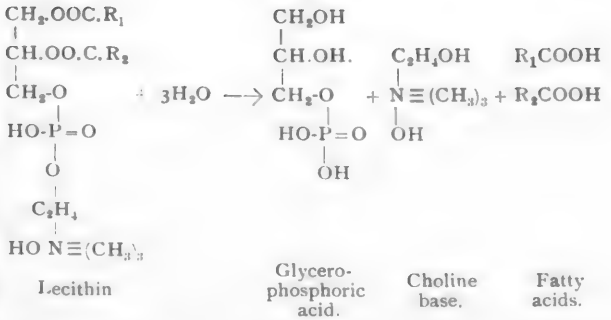
Proteolytic activity has received a certain amount of attention, although as far as the present writer is aware no information is available on the effect of this activity on the actual structure of the dough. It is thought by several cereal chemists that proteolysis is involved in the softening of the dough and gluten towards the end of fermentation, which is associated with what the baker terms the "ripening" of the dough. It is this softening which allows the greater distensibility of the dough as it becomes fully "ripe", but little is known as to the mechanism of the action of these enzymes. Attempts to measure the amount of proteolysis by the production of amino acids have failed because, presumably, the breakdown of the protein does not proceed to this advanced stage. This does not preclude the possibility of physical changes in the protein meshwork as a result of proteolytic action without chemical breakdown, or at any rate without complete breakdown.

Fat

The quantity of fat in flour is very small, and little is known of the rôle it plays in dough structure or dough properties. Various methods of analysis have been known to give different results; by hydrolytic methods results are higher than by the simple direct extraction method. Now flour contains certain lipoid substances—that is, substituted fats containing nitrogen or nitrogen and phosphorus—and it is to be expected that the hydro-

Wheat at a country railway station, Australia.

Crossing different strains of Wheat, Australia.



Some evidence has been obtained of a combination between carbohydrate and fat in maize, although this has not yet been discovered in wheat, but Alsberg has expressed the opinion that this may be present.

Attempts to correlate lipoid substances with baking strength have been made by Working and others with the suggestion that lipoids and phosphatides have a weakening effect on the dough or gluten fibrils, similar to the effect of an oil on rope. If this were so it would fit in satisfactorily with Swanson's picture and show that these fatty substances play a definite physical rôle in flour quality. Generally speaking, the lower the grade of the flour the higher the lipoid content, and Kent-Jones has remarked: "Possibly that low-grade feeling of deadness so difficult to describe, but so well known to bakers, is due to the increased amount of lipoid present." Working, considering dough as a foam structure, has attempted to explain the action of oxidising agents by the reaction between the phosphatides or lipoids and the oxidising agent. He has found that the presence of phosphatide is necessary in a dough and suggests that the beneficial effect of oxidising agents may be due to their action in rendering phosphatides more soluble in water, whereas too much oxidising agent may be injurious because of the destruction of phosphatide or the liberation of too much. Geddes has supplemented and extended this work and has attempted to explain the improving results of heat treatment, in addition to those of oxidising agents, as being due to the effect on these fat-containing bodies. It is not accepted by all cereal workers, however, that this reasoning gives a satisfactory answer to all the practical observations on flour treatment.

Numerous observers have commented upon the results of extracting flour with ether or fat solvents,

lysis methods of determination will include these substituted fats as well as any free fatty materials, thus accounting for the higher results. It has been shown that hydrolysis by acid gives a greater quantity of fat than hydrolysis by alcohol or alkali, and further that the fat extracted after the acid hydrolysis contains less nitrogen and phosphorus than that after alcohol and alkaline hydrolysis.

Lipoids are usually found in plant products in combination with protein material, and on hydrolysis this compound molecule will break down firstly into lecithin and protein and subsequently into the choline base, glycero-phosphoric acid, and the fatty acids. It has been suggested that the alkaline and alcohol hydrolyses effect the first stage and thus extract the lipoid compounds as such, while the acid method produces, at any rate partially, the second stage, breaking down the liquid molecule into its hydrolytic products.

White Bay Wheat Silos, Sydney, New South Wales.

and their deductions are contradictory and inconclusive, but, on the other hand, Fisher and Jones have shown that the addition of extracted flour oil to a dough will produce a decided bread improvement. The part played by oils, lipoids, and phosphatides in the dough structure may therefore be left at the moment as an open question with several interesting theories and pictures to consider.

Mineral Matter

The ash content of flour is only about 0·5 per cent., but varies with the commercial grade of the flour. The outer layers of the berry, or the bran, contain more ash than the endosperm, and therefore the presence of bran powder in a flour will be reflected by a higher ash content, although Simon, in calculating the bran powder content from the ash content, assumes that the endosperm itself contains 0·32 per cent. ash. The ash consists mainly of potash and phosphoric acid, together with smaller quantities of magnesia, lime, iron, alumina, sulphur, sodium, chlorine, and silica, and earlier workers reported varying quantities of these substances. Teller showed that potash and lime are found in larger quantities towards the interior of the berry, whereas the maximum quantities of magnesia are found in the bran. Kent-Jones notes that this mineral matter in flour is intimately associated with the organic constituents and cannot be separated by physical means. It is believed that much, at any rate, of the phosphorus exists as a phosphoric ester known as phytin, and that this is hydrolysed on the addition of water with the formation of inorganic phosphate; it is quite definite that on incubation of a flour suspension in water at 27° C. the amount of ionised phosphate is appreciably increased. Lipoid phosphorus is, of course, also present in small quantities.

In a recent paper Sullivan gives the following figures for an average analysis of the elements in a patent flour:

Potassium	0·168	per cent.
Phosphorus	0·113	"
Sulphur	0·165	"
Magnesium	0·029	"
Chlorine	0·051	"
Calcium	0·016	"
Sodium	0·003	"
Silicon	0·005	"

The sulphur figure includes that obtained from the amino-acids, cystine etc, of the gluten.

These figures differ in certain respects from earlier analyses.

It is not known how these mineral substances affect the baking quality of a flour or in what way they enter the dough structure. There is no doubt that the total quantity of ash in flour does have a pronounced influence on the baking quality of that flour, but no explanation has come forth as yet to explain this, except the colloidal conception of Wood and Hardy that the condition of the gluten was modified by the electrolytes of its surrounding medium. As already pointed out, the reaction of the protein complex to the electrolyte concentration has not been fully studied by Bungenberg de Jong.

The mineral constituents of flour, however, have another important aspect, and that is the value of such traces in human nutrition. Sullivan has summarised the work connected with flour and bread and has given the following figures for the elements found in traces in a patent flour:

Zinc	40	p.p.m.
Iron	8	"
Manganese	3	"
Boron	4	"
Copper	2	"
Aluminium	0·6	"
Bromine	1	"
Iodine	0·004	"

Quoting from this paper, it is found "that the cereals are a very excellent source of phosphorus," and, of course, potassium is supplied in appreciable quantities. Magnesium is now believed to be an essential dietary constituent and is found in bread and cereals. With regard to calcium, a sufficient supply is necessary in human nutrition, particularly for the proper formation of bones and teeth, and the same author remarks: "Flour and bread are not as good sources of calcium as they are of phosphorus; still, the cereals contribute a certain share toward the average calcium intake". The sodium and the chlorine contents of bread are high and in no relation to those of flour, owing to the salt in the baking formulæ.

Little is known of the exact function of the other elements in human nutrition, but that many of them have some definite value is now believed by some physiologists, and it is therefore of paramount importance to learn from Sullivan that "a comparison of the mineral content of wheat and its products with any other single article of food will show that wheat products make a very important contribution to the mineral requirements of our diet".

Position in Diet

Seeing that the major part of flour is consumed in the form of bread, the position of flour in the human diet becomes essentially the position of bread. Bread has been attacked by many and much has been written against the consumption of bread. Most of the derision which has been thrown at bread has been due to the fact that it is not in itself a complete food. But how many articles of normal diet are such complete foods in themselves? The writer ventures to suggest very few, and it seems strange that bread should be the one so frequently attacked on these grounds. In a normal mixed diet there are many substances which can lay no claim whatever to completeness, but most have some definite dietetic value. The science of dietetics has advanced rapidly in recent years and is steadily progressing. There are many aspects now recognised of food requirements, and it is inadvisable to consider only one specified aspect; a substance which may not satisfy in one direction may be of great value in another.

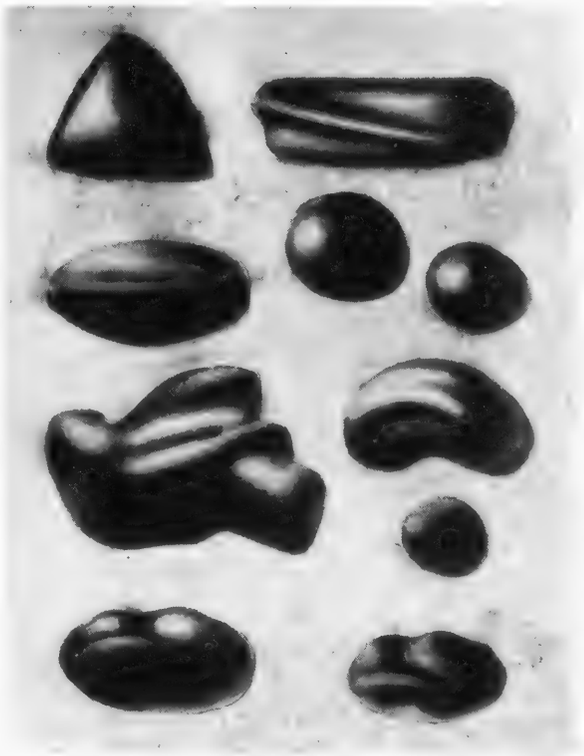
Bread naturally is a valuable source of carbohydrate, and owing to its very cheap price it does provide the cheapest energy-giving food in the diet. The protein content is not high, but, on the other hand, it is not negligible; not only does the total quantity of protein have significance, but also the amino acids yielded by these proteins on digestion. Thus Carr points out that more than twenty of these amino acids are well known and that some of them—*e.g.*, cystine, tryptophane, and histidine—are essential to life. The gluten proteins are said to yield the following amino acids on hydrolysis: Histidine, arginine, lysine, tyrosine, and glutamic acid. Although flour proteins may not have a full biological value, this surely does not mean that they have no value, for it has been shown that bread and its complementary articles of diet do furnish together proteins of high biological value. Further, the fat content of bread is low, but bread is not always eaten alone. Surely in considering diet the merit or demerit of one component of a meal is of less importance than the food value of the meal itself. Thus may be instanced bread and butter, bread and cheese, bread and milk, and bread and meat; none of these alone would furnish a complete diet, but jointly good food values are obtained. Jago, at the recent Symposium on "Bread and Milk," made a plea for the recognition of bread in its rightful place as a *component* of human diet, not as a single article of food. He emphasized one important point, and that is that in bread the constituents are in an easily digestible form.

Vitamins

An enormous amount has been written on the subject of vitamins, and many of the attacks on bread have been due to the fact that it is not a universal supplier of all the necessary accessory factors. Attempts are being made to "enhance" the food value of bread by addition of various ingredients. Thus at this Symposium independent appeals were made for the inclusion in the dough mix of milk solids to the extent of 4 to 6 per cent. of the weight of the flour and of 1 lb. per sack of dried yeast powder. In this connection, however, Jago pointed out that with modern short fermentation systems as much as 4 to 5 lb. per sack of fresh yeast may be used, which presumably will augment the vitamin B content of the resultant bread.

Is this search after a "health" bread really desirable? Is it to the public benefit to attempt to make bread the complete nutritional food? The present writer does not agree that present-day bread is useless and tasteless; a correctly fermented well-baked loaf is not only attractive in appearance, but it is palatable and is enjoyed by all. Bread is supplied in many forms—*e.g.*, plain bread, brown bread, milk bread, Vienna bread and rolls, fruit bread, etc.—ample scope for variation and choice. The writer believes in as mixed and varied a diet as is possible with bread in its rightful place to supply abundant calorific energy in a cheap and easily digestible form. The more variation there is, the more chance of obtaining all the known and unknown nutritional requirements, but there must be a sound basis of good energy intake—*i.e.*, bread.

Bulk-loading Wheat, White Bay Silos, Sydney, New South Wales.



LECITHIN

ITS USE IN CHOCOLATE MAKING

By Harold Silman, B.Sc.

LECITHIN IS one of the group of phosphatides which occurs in the structure of animal cells, notably the nerves and brain and in the egg. It also occurs in various seeds such as the cacao bean and the soya bean, whence it has recently been found possible to extract it to the extent of some 2 per cent. Vegetable lecithin differs somewhat from animal lecithin in its properties because in the latter product it is probably associated with different members of the phosphatide group and also in different proportions than in the former. It is not possible at present to produce chemically pure lecithin on the commercial scale, although the structure and constitution of the substance are well known.

Lecithin is extracted from the soya bean and sold usually incorporated with about 30 per cent. of a fat as a carrier of the phosphatide compounds. It has been claimed, by reason of the fact that the phosphatides occur in nerve cells, that lecithin is of tonic and nutritive value, but there is little medical evidence either to confirm or disprove this view.

Its use in chocolate making consists in the fact that it is an excellent fat-soluble emulsifier and acts by being adsorbed at the interface between the fat and the solid components. Although it is also a lyophilic colloid stabiliser of great use in oil-water emulsions, in certain cases its action fails. For example, it will not effect the emulsification of mayonnaise, though egg-yolk does this perfectly satisfactorily. The reason for this is not quite clear, but may be due to some specific interaction between the various phosphatides in the egg-yolk and the other components.

Lecithin occurs naturally in cocoa-butter in small but very varying percentages, and for reasons which will appear later it will be seen that there are great advantages to be derived by artificially adding to the natural content. The method of addition is to melt the lecithin in warm fat and to mix the solution thoroughly with the whole fat to be used in the batch: it is found that about 0·2 per cent. of lecithin will enable the fat content of the resulting chocolate to be reduced by from 4 to 6 per cent. while still retaining the original fluidity. Such a procedure effects a notable reduction in cost, and it is possible to go down to as low as 28 per cent. fat in this way, although the risk of the development of sugar bloom is greatly increased below about 30 per cent. fat owing to the increase in porosity of the surface, which enables atmospheric moisture to dissolve the surface sugar with subsequent recrystallisation on cooling. Lecithin, being a highly unsaturated substance, is very readily oxidisable and is also hygroscopic; it will decompose if heated over about 150° F., and care must therefore be taken to avoid exceeding this temperature while the lecithin is present in the chocolate, either by adding it at a later stage or by suitable heat treatment.

Another method of incorporation is to add 0·3 per cent. of lecithin to the chocolate constituents in the conches after they have been allowed to mix the solid butter and the chocolate to a uniform state. The mass will then liquefy very quickly and can be readily run off. A considerable saving of time can be achieved, because in the ordinary way sometimes days of working are required in the conches before the fat has an opportunity to surround the minute particle of cocoa thoroughly.

As with all new products, extravagant claims have been advanced on behalf of lecithin to the effect that its presence will inhibit or delay the formation of fat bloom and sugar bloom. This has not been borne out by the writer's experience, although the conditions of temperature and humidity attending the formation of bloom are so varied and depend so much upon the previous treatment of the chocolate during all its processes of manufacture that it is difficult to be dogmatic on the subject. The most that can be said is that, since the presence of an effective homogeniser must improve the fat incorporation, its effect may be useful in a slight measure in increasing the shelf-life of a product, provided reasonable care is taken to prevent rapid changes of temperature and other conditions which lead to these troubles.

In avoiding the formation of fat bloom it is essential that the maximum proportion of the fat present should crystallise, since otherwise it will exist in the chocolate in

an unstable, super-cooled form and will crystallise subsequently on the surface on exposure to favourable temperature changes, leading to a greyish unpleasant appearance, which, although harmless, is sufficient to render the goods unsaleable. The promotion of fat crystallisation is achieved by slow cooling with constant stirring, but, on the contrary, too slow cooling will result in a rough chocolate due to the presence of large crystals. It is thus necessary to obtain a suitable medium between these extremes in order to produce a smooth stable chocolate: the use of lecithin will change the softening temperature of the chocolate, which may possibly help to lessen the susceptibility to temperature changes. It will also assist materially in promoting the smoothness of the chocolate by inducing an intimate crystallisation of the fat particles, although it will obviously not correct roughness due to insufficient grinding of the cocoa and sugar constituents. There is a large variety of fats in cocoa-butter, and each has a different setting point; thorough emulsification by means of lecithin will cause the crystals of different fats to form in close proximity, which will prevent them growing to any considerable size in spite of slow cooling. This is particularly useful where thick blocks and heavy couvertures are being made, because in these cases cooling in the interior of the block is extremely slow owing to the evolution of the latent heat of crystallisation, which cannot readily escape and causes a granular and grey appearance when the block is broken due to large crystal masses.

Lecithin has been used in cocoa powder to increase the suspensibility of the particles in the beverage, but it must be remembered that lecithins are decomposed by alkalies with the liberation of choline and the subsequent production of amines. The use of lecithin with alkalised cocoa powders must therefore be avoided, because the presence of an unexplained fishy odour in cocoa when it reaches the consumer may result in much needless recrimination.

In making drinking chocolate the writer has found that the use of quite a small proportion of lecithin will enable a considerable amount of cocoa-butter to be used to make a stable beverage without the separation of fat at the surface.

One of the best uses to which lecithin may be put is in enrobing processes because of the increased flexibility of temperature range which it allows to the manufacturer. It is well known that a drop of one or two degrees in temperature will result in a considerable thickening of the coating deposited on the centres, while more will cause freezing. The presence of as little as 0·2 per cent. of lecithin will result in a constant fluidity over a wide range, and will often enable the chocolate to be worked till as low as 83° F. before freezing commences.

It will thus be seen that lecithin offers a considerable number of advantages to the chocolate manufacturer if he will study the conditions under which it may best be used in his own works.

★ ★ ★

OVERMATTER

SEVERAL interesting articles and continuations await publication. First of all there is the conclusion of Mr. McLachlan's article on waste water treatment, and two further contributions to the Milk in Bread discussion. The conclusion of the article on sardine canning which commences in this issue will be found as interesting as this first instalment. There are also articles on sterilisaton of dairy farm utensils, apple preparations, and sugar loaves. We hope to be able to include all these in the January, 1935, issue.

★ ★ ★

Correspondence.

To the Editor, FOOD MANUFACTURE.

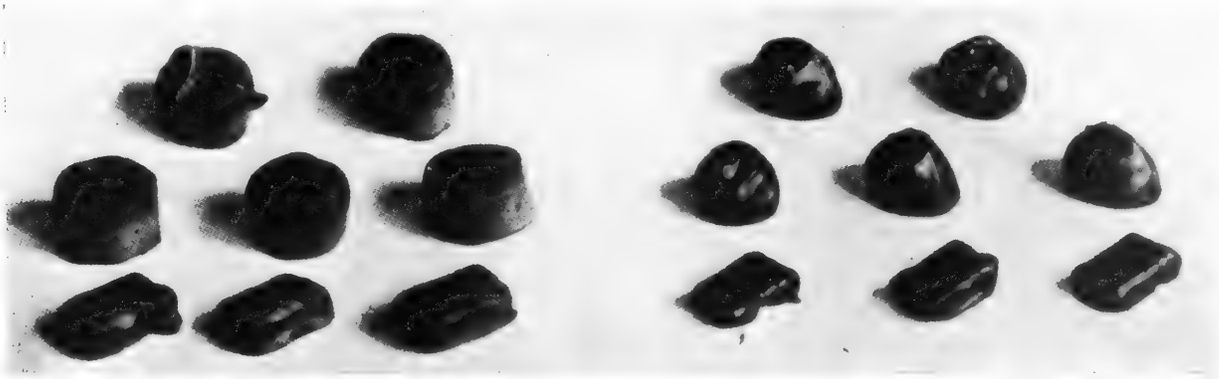
DEAR SIR,

The remarks by the Chief Medical Officer of Health regarding canned peas are only too true. A year ago I stressed this point both at a meeting of the Society of Chemical Industry and in a letter to a canning publication. Less than a month ago I asked at the Kingston branch of a large multiple shop for a can of peas and was offered the same size can at 5½d. and 11½d. The assistant assured me they were both fresh peas, picked and canned the same day. I took the cheaper and found they were processed peas. I ask the question, "Had I obtained the nature, quality, etc., which I had been led to expect?" Surely if the public do not realise the difference, and labels may be ambiguous, then it it is the duty of the Ministry of Health to take official samples and examine them, and if necessary institute proceedings against the offenders.

Yours truly,
G. GRINLING.

51, PALACE ROAD,
EAST MOLESEY, SURREY.

November, 14, 1934.



Startling results of a lecithin experiment which gives promise of dispelling the "bloom" bogy. Both sets of samples made with the same coating were subjected to identical temperature conditions in an electric oven. The sample at the right contained a fractional percentage of commercial lecithin.

The Technical University, Budapest.

FOOD RESEARCH AND EDUCATION IN HUNGARY

By C. Taxner

Chemical Engineer at the Research Station of Fermentation, Budapest.

HUNGARY, BEING to a large extent an agricultural country, possesses food industries of great importance. In the early days of industrial development after the invention of the steam engine the beet sugar, flour, cheese, meat and milk, and other food industries developed rapidly, and now they rank as the most stable and important in the country.

This industrial growth has been followed by research and education, which were initiated in the early days of Queen Maria Theresa, who established several institutions for agricultural and food investigation. Her pioneer work was continued by successive governments, as well as by private persons. In the middle of the last century, owing to political differences with Austria, the development of the research and educational work in the food industries declined until 1867, when the independent kingdom of Hungary was restored. Since that time there has been a great development of interest in the subject.

To-day there are many research laboratories and special training schools in connection with the food industry. Soon after 1867 the Hungarian Government and the Ministry of Education introduced an evening continuation school system for training workmen. The fundamental principle of this scheme is that every youth who is engaged in the industry must be sent by his master to the evening school, where he is specially trained in his subject as well as receiving instruction in fundamental subjects such as arithmetic, book-keeping, etc. There are evening schools for bakers, confectioners, and so on. This scheme forms the first step in the production of well-trained workmen.

Later the need arose for a more advanced and more thoroughly specialised training in the various food industries. The Ministries of Agriculture and Trade therefore founded several special schools and courses for industrial instruction.

Thus there is a Research Station and Dairy School in Magyaróvár. This is for the training of dairy workmen and cheese and butter makers, and there are special courses for farmers in hygiene and up-to-date methods of milk production. Another very important special course was founded for training millers and bakers. This is closely connected with the Grain and Flour Research Station.

For the industries dealing with the canning, preservation, and pickling of fruit, vegetables, and meat there are special courses arranged at the Research Station of Fermentation. The same institution is responsible for training distillers, brewers, vinegar producers, and liqueur distillers.

The highest scientific education concerned with food industries takes place at the universities, especially at the Politechnicum of Budapest. There are special professorships for the flour trade, food chemistry, dairy work, brewing, and distilling, and well-known experts lecture in each group of the food industries. At the School of Technology there is a special department for industrial psychology where every workman can be tested according to modern psychological technique.

Industrial research is carried out by government and factory laboratories as well as by the universities. The government laboratories are chiefly associated to the University of Agriculture.

For the dairy industry a great deal of research work on milk, cheese, cream, butter production is done by the Dairy Products Experimental Station at Magyaróvár. The bacteriological work of the dairy, milk hygienics, and pure culture production for dairies are carried out by the Department of Milk Hygienics at the University of Veterinary Sciences. On the other hand, the Research Station for Animal Nutrition deals with the feeding problems of cattle.

Flour and grain research was begun very early in the last century by scientists such as Mechwart, Kossutány,

The Dairy Research Station at Magyaróvár, showing a section of the experimental cheese-making department.

Pekáry, and nowadays Hankóczy. To combine all the various establishments in one large institution for research and education concerning the flour, grain, and baking trades, the University of Agriculture recently founded a modern research station for this purpose. The chemical and physical laboratories of this research station are numerous and very well furnished. There is a model mill and bakery for research and educational purposes. Eugen Hankóczy is in charge, and it will be recollected that he is the inventor of the "farinograph," an apparatus for testing and recording the water absorption of flour and the quality of the gluten.

Very closely connected with food industry research is the Research Station of Fermentation. It is divided into two parts, one of which is occupied with the preservation of fruit, vegetables, fish, and meat. A model canning factory has been established at the station. The other department deals with the problems of the distilling, brewing, beet sugar, vinegar, yeast, brandy, and liqueur industries.

A peculiar Hungarian spice is the paprika, and for its production a great industry has developed. In connection with this there are two experimental stations, where chemical, physical, and botanical methods of research are applied to all the problems of paprika growing, drying, and grinding.

For the aid of wine producers there is a special Research Station of Ampelology and Wine.

Another very important department of food research is concerned with human nutrition, and this is undertaken by numerous university and government research departments. In connection with vitamins the name of Professor Szent-György is well known in this country for his work on ascorbic acid.

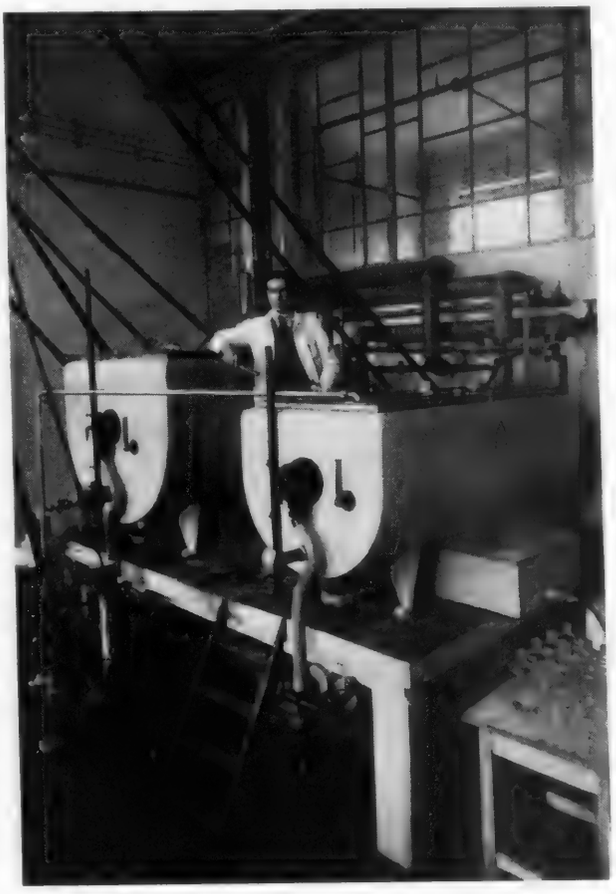
Food inspection is the duty of government and municipal food laboratories which control the food trade by a regular system of inspection at the place of production and at the market. The laws which established this system were instituted as early as 1876 and completed in 1896 by the Food and Drug Act. The chief laboratory belonging to the government is the Central Chemical Laboratory in Budapest.

2,000 Years Ago

Milk*

ALL milke commonly is of good juice, nourishing, mollifying the belly, causing the stomach & bowels to be pufft up with inflation. But that is of a more waterie substance which is of ye spring, than that of the summer, & that which commes of green pasture doth more mollify the belly. That milke is best which is white, & of an equall thicknesse, & which standes when it is dropt on ye nayle. But goat's milke doth lesse stirr the belly, because goates for ye most part do feed on binding food, on ye oake & Lentisck, & the leaues of the Oliue tree, and Terebinth, wherefore it is also good for the stomach. But sheep's milk is both thick & sweet & very fatt, but not soe good for ye stomach. But cow's milke, and ass's, and mare's milke make the belly more laxative & trouble it. . . . But all milke when it is sod becommes binding of the belly. . . . And against all itchings of appearance, pustules, & corrupt humors, it is given new, with raw hony, & a little water tempered together, salt also being mixed with it. But that which hath been once sod, is lesse inflative. But that which is sod to half with peeble stones doth help the fluxes of the belly.

* From *The Greek Herbal of Dioscorides.*—(Translated into English in 1655.)



Cream-conditioning tanks at Magyaróvár.

IMPROVED METHODS OF JELLY MANUFACTURE (Continued from page 429).

tion of jelly because of the removal of just so much buffering material[3] from the juice. Jelly made from freshly expressed juice has an excellent flavour. With some grape juice extractions the percentage of added sugar should be lowered on account of the high fruit sugar content.

Apple and Mint Jellies

Apple jelly is quite popular on account of its low cost. There is so much excess pectin in apples that the full flavour of the fruit is not developed in the jelly produced. By adding a small amount of acid during the extraction process, some of the pectin quality is destroyed and a jelly of better flavour is produced. Most apple jelly is a very mild-flavoured product of light pink colour. Apple juice quite commonly forms the base for mint jelly. Mint jelly is artificially flavoured and coloured a bright green.

The use of viscosity as an index of the sugar requirement and of the jelly yield of a fruit juice extraction is rapidly growing in favour. Soft or syrupy jelly resulting from the use of more sugar than is required, or from insufficient cooking, is no longer made. The jellies made by this method are uniform in strength because just the right amount of sugar is used for the pectin present. The strength can be regulated as desired. However, and this is the most important point of all, full use of the available pectin in the fruit juice extraction is made without resort to synthetic preparations.

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[2] P. B. Myers and G. L. Baker, *Del. Agr. Exp. Sta. Bul. No.* 149, *Tech. No.* 8.
[3] P. B. Myers and G. L. Baker, *Del. Agr. Exp. Sta. Bul. No.* 144, *Tech. No.* 7.

Getting Ready for Christmas

WHEN we went over Messrs. Peek, Frean's biscuit factory at Bermondsey a few days ago we found evidence of special seasonal activity on all sides.

There are 2,000 girls and 300 men and boys employed at this huge factory, which stands on 10 acres of ground, has a total floor space of 20 acres, and is quite properly known as "Biscuit Town".

Mr. Sam Bishop was busy making plum puddings; he has been employed by the firm for 42 years, and has been making plum puddings for a quarter of a century. The mixer which he uses takes 200 lb. of material at a time, and the puddings when made are cooked for 6 hours.

Large quantities of puddings are sent to America (a record order was recently received from New York); others go to France, Switzerland, Holland, and Denmark. The American public like to see their puddings in decorative basins, and for this reason special basins with a holly design are used; plain basins are employed for the home market.

Every kind of biscuit was being made, with special emphasis on Christmas novelties; we were told that these latter were "planned" at the beginning of November, 1933, and that experts are now planning the list for Christmas, 1935!

A very remarkable biscuit making machine of unique construction was designed by one of the firm's own engineers. It is completely automatic and has an overall length of 182 ft. This includes 30 ft. for the dough to be rolled out, 114 ft. for the baking, and 38 ft. for "rowing up" (the operation of transferring the biscuits on to moving trays). This machine, a photograph of part of which appears on this page, has proved such an outstanding success that it is now being made, under royalty, for other concerns.

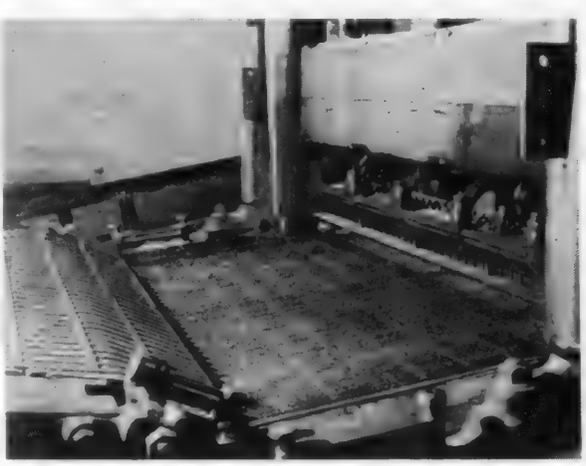
Another very successful machine, simple yet ingenious, which we saw in operation, was one for creaming sandwich biscuits; this also was designed by one of Messrs. Peek, Frean's own engineers.

A new "biscuit" which we saw being made was the Peek, Frean "Corona Cigar". This comprised a tube, very crisp and of a consistency all its own, filled with a delicious pale chocolate coloured confection and complete with band! The firm, we were informed, make over 200 different kinds of biscuits, which are sent all over the world (we saw a consignment marked "Tientsin"), and one machine alone turns out 5 tons in a day. "Everything that is broken that *doesn't* go on the floor is sold as 'broken biscuit'", said our guide, and added that there is quite a brisk demand for this.

On the way to one of the many departments we were shown the Power House, and were told that Messrs. Peek, Frean's is the biggest private switchboard in S.E. London.

Christmas cakes were naturally very much in evidence, and we saw girls decorating these (picture on next page) and wedding cakes. In regard to the latter, we were interested to learn that women workers who leave the firm after 3 years' service to be married are presented with a 17-lb. wedding cake; approximately 120 of these are given away each year.

Messrs. Peek, Frean's Christmas cakes are exported to Italy, Holland, Belgium, Denmark, Gibraltar, and Malta, but England is the chief market.



Automatic Biscuit Making Machine: After the biscuits have been stamped out, the mesh shown on the left passes back again to the batch of dough. The biscuit shapes cut out pass underneath to the ovens

Dr. Lampitt Appointed to F.I.B.

It is gratifying to find that "those in authority" have recognised the work of chemists associated with industry by the recent appointment of Dr. L. H. Lampitt to a seat on the Food Investigation Board. Dr. Lampitt is well known to readers of Food Manufacture by reason of his contributions.

Even when at Birmingham University, carrying out research on the metabolism of yeast, Dr. Lampitt turned his attention to "food" and obtained the Diploma of the British School of Malting and Brewing.

For three years previous to the war he was Chief Chemist to La Meunerie Bruxelloise, the largest flour mill in Belgium, and since the war his association with J. Lyons and Co., Ltd., has given him unequalled opportunities to become an authority on the scientific treatment of food in all its aspects. It must be remembered that Lyons, besides being the world's largest catering firm, is also one of the largest distributors of food products, and many of the particular problems of the F.I.B. are essentially problems which have been considered by the scientific staff of the firm.

Dr. Lampitt is a trenchant critic of chemists in general, as his lectures all over the country to various scientific bodies show, but he, nevertheless, has a firm belief in the future of the chemist. The success of the Food Group of the Society of Chemical Industry under his chairmanship has already justified its formation, and has demonstrated in many ways the common ground there is between the food chemist and his brothers in other industries.

Strong leadership and a consolidation of the various chemical societies are always stressed by him, and his interest in such matters is demonstrated by the fact that he has served for various periods of years on the Council of the Society of Chemical Industry, the Institute of Chemistry, the Society of Public Analysts, the Committee of the Biochemical Society, and the Federal Council. He has attended conferences in most parts of Europe, and is well in touch with all food movements all the world over. His speciality is milk, and he has devoted much time to fundamental research work on the composition of this primary foodstuff.

Food Manufacture offers Dr. Lampitt its heartiest congratulations, and we feel sure that all our readers will desire to join with us in wishing him continued success.

Decorating Christmas Cakes at Messrs. Peek, Frean's Factory.

The Editor of Food Manufacture, Dr. H. B. Cronshaw, has been elected as one of the Hon. Auditors to the Institute of Chemistry (London and South-Eastern Section) for the forthcoming session.

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RAISIN OIL*

As many as 4,000 tons of seeds a year are produced by the California raisin industry, and to this seed a certain proportion of the pulp of the raisin adheres, with its content of 80 per cent. dextrose.

In the production of raisin oil, the seeds and pulp are first washed with warm water (alcohol and brandy syrup are eventually recovered from the wash water), and are then dried and stored in bins for curing until such time as a sufficient quantity has accumulated to justify crushing.

The seeds contain about 15 per cent. of oil, which is recovered in much the same way as most seed oils, by the ordinary sequence of grinding, cooking, and hydraulic pressing. The oil cake may be used as a foodstuff for stock or as fuel or fertiliser.

In one very interesting application of the raisin oil it is returned to the industry from which it originated, for an enterprising manufacturer has found that, by coating the surface of seeded Muscat raisins by subjecting them to a mist of raisin seed oil, their stickiness, which was a considerable sales handicap, is entirely eliminated.

The oil also finds favour as a salad oil, and blends perfectly with olive oil.

* Abstracted from an article in *Food Industries*.

Industrial News

INTERNATIONAL BREAD PRICES—ANOTHER FOOD EXHIBITION—CANADIAN CANNING STATISTICS—LEIPZIG SPRING FAIR—BANANAS BARTERED FOR GLASS—THE FOOD GROUP—"COLLABRAC" LECITHIN FOR CONFECTIONERY—LOWER SUGAR CONTENT OF CONTINENTAL BEET

International Bread Prices

The French corn concern, Goldschmidt and Co., recently issued a report giving the cost of a kilogram (2·2 lb.) of bread in different countries. From their survey it appears that bread is cheapest in Belgium and dearest in Germany. It is also comparatively cheap in Great Britain.

The figures below give the price per kilo in French francs:

Germany 4·20, Finland 3·40, Sweden 3·10, Norway 3·00, U.S.A. 3·00, Denmark 2·60, Canada 2·40, Holland 2·35, Italy 2·25, France 1·97, Iceland 1·68, Australia 1·56, Switzerland, 1·56, Spain 1·45, Great Britain 1·35, Czechoslovakia 1·20, Belgium 1·02.

Another Food Exhibition!

A fully representative show is already assured for the second National Food and Beverage Exhibition to be held at the City Hall, Deansgate, Manchester, from February 5-16, 1935, and numerous attractions and competitions will create widespread interest.

A considerable proportion of the available space has already been let, and early application is now necessary to obtain a position of prominence.

Full particulars of available space, etc., will be supplied on application to the Exhibition Offices at the City Hall.

New Vitamin Preparations

At the recent London Medical Exhibition were shown tablets of vitamin C isolated from natural sources, each of which, it was claimed, was the equivalent of about 2 tablespoonfuls of orange juice. Among the many other exhibits were stimulating meat beverages containing vitamins A, B, and D, sweetened fruits without sugar, granules of ferrous phosphate flavoured with chocolate, etc.

Canadian Canning Statistics

In order to make available statistics on canned vegetables immediately after the completion of each pack, the Dominion Bureau of Statistics has now decided to make a separate report for each product or group of products canned.

The preliminary figures (subject to revision) for the 1934 season are as follows:

	Quantities.	
	Cases.	*Lb.*
Asparagus ...	56,398	1,345,945
Spinach ...	22,431	730,281
Peas	1,362,218	41,309,439
Quebec ...	263,200	7,912,005
Ontario ...	942,041	28,547,122
British Columbia	156,977	4,850,312
Rhubarb ...	6,509	276,858
Apricots ...	36,954	987,769
British Columbia	36,954	987,769

The figures for spinach are subject to an upward revision, as some spinach is also canned in the fall.

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Full information on food products, beverages, rubber, tobacco, and miscellaneous manufactures based on vegetable products will be found in the 1932 Census of Industry just published by the Bureau of Statistics of the Canadian Department of Trade and Commerce.

Pig Breeders Exhibit Bacon

An exhibition consisting of competitive entries of British pork and bacon was organised under the auspices of the National Pig Breeders' Association on Wednesday, November 14, at the Repository, Peterborough.

On the same day, also at the Repository, was held the N.P.B.A.'s show and sale of 160 breeding pigs. The sale is one of the most important of the year.

Leipzig Spring Fair

The General Samples Fair at Leipzig will be held from March 3-9 next year. Amongst approximately 5,000 exhibitors there will be 65 showing foodstuffs and 17 showing packing materials. It is expected that the number of exhibitors will be considerably increased on the strength of negotiations with the National Food Board, which embraces the whole of the foodstuffs and provisions industry in Germany.

Besides the general exhibition there will be a great Engineering and Building Fair, where approximately 2,000 firms are showing machinery, among whom are represented the most important manufacturers of packing machinery.

A reduction of 33⅓ per cent. is granted to all Fair visitors on the through journey to Leipzig.

Annual Reports Received

Just to hand are the Annual Reports of the East Malling Research Station, East Malling, Kent, covering the period January 1 to December 31, 1933 (21st year), and the National Institute for Research in Dairying, Shinfield, near Reading (a department of the University of Reading) for the year ending July 31, 1933.

Bananas Bartered for Glass

Since the beginning of February goods to the approximate value of 9·5 million Czech crowns have been exchanged in accordance with the renewed banana-glass barter treaty. Several leading firms are participating in glass exports, principally to England and her colonies. At the outset the banana importing firms demanded an increase in price up to 12 per cent. in order to render possible the sale of glass at a profit. As a result of currency devaluation this measure, which involved serious difficulties, became unnecessary and glass exports became possible.

The Food Group

A Joint Meeting of the Food Group of the Society of Chemical Industry with the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, on Wednesday, November 14, Dr. L. H. Lampitt, Chairman of the Food Group, being in the Chair.

The following papers were read and discussed:

"The Identification of Common Edible Sea Fish" (with demonstration), by C. H. Hatterley (Chief Inspector, Fishmongers Company. "Fish Oils and their Vitamins", by Norman Evers, B.Sc., F.I.C. "The Composition of Fish Pastes", by H. E. Cox, D.Sc., F.I.C. "Note on Fish Pastes", by C. H. Manley, M.A., F.I.C. "Some Observations on the Amounts of Amines and Free Ammonia in Fish Products", by D. H. F. Claysen, B.Sc., F.I.C., and L. H. Lampitt, D.Sc., F.I.C. "Some Observations on Methods of Estimating the Degree of Preservation of White Fish", by G. A. Reay, Ph.D. (Torrey Research Station).

Forthcoming Meetings

The Members' Meeting of the Food Group will take place on Wednesday, December 12, 1934. On January 7, 1935, Prof. T. P. Hilditch will speak on "The Fats: New Lines in an Old Chapter of Organic Chemistry" at Burlington House (8 p.m.). Dr. H. B. Cronshaw will open a Discussion on "Training of the Food Technologist" at the London School of Hygiene and Tropical Medicine on February 13, 1935, and on March 4 a Discussion on "Physiological Aspects of Additions to Foodstuffs" will be held at Leeds.

A Symposium on Meat will be the subject of a joint meeting with the Liverpool Section of the S.C.I. in the Chemical Department of Liverpool University on March 8, 1935, and on April 17 a joint meeting with the Institution of Chemical Engineers will be held at 21, Tothill St., Westminster, when the subjects will be "Heat Exchange in Food Factories" and "Steam Equipment for the Food Industry".

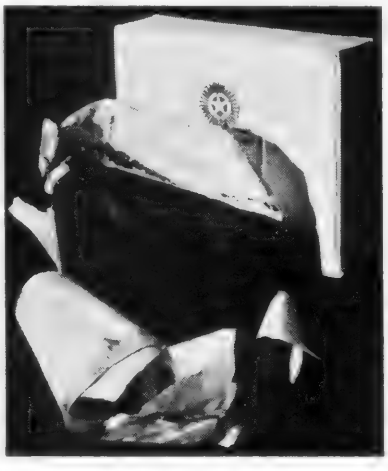
Selenium Soil Poisoning in U.S.A.

American Agriculture Department experts have discovered that approximately 50,000 acres of western farm land, scattered through six States, are afflicted with soil poisoning caused by the presence of selenium. The Department recommends that the poisoned areas, entirely unfit for crops or pasture land, be withdrawn from production. Wheat or growing plants absorb the selenium, which poisons cattle feeding on plants or grain raised on the poisoned soil.

"Collabrac" Lecithin for Confectionery

In the manufacture of caramels, toffees, etc., it is essential that the batch should be completely emulsified throughout, in order to ensure the complete absence of grease spots and layers of fat on the finished goods. It is found that, even with the best machinery, some emulsifying agent is necessary to ensure thorough homogeneity and stability, and "Choc Collabrac", a 75 per cent. lecithin product manufactured by Messrs. A. Boake, Roberts and Co., Ltd., at Stratford, London, E. 15, is stated to be particularly efficacious in this respect.

In addition to its stabilising action it shortens the time of boiling and reduces the viscosity of the mixture,



so that emulsification may be effected with less expenditure of power.

A descriptive leaflet gives the following typical recipe for toffees: 20 lb. sugar, 20 lb. glucose, 5 lb. invert sugar, 34 lb. condensed sweetened whole-milk, 20 lb. fat, 1 lb. fat in which ¼ lb. of Choc Collabrac has been dissolved by cautious melting; the manufacturing procedure is also described.

The material is packed in cartons in 5-lb. slabs, one of which is shown in our illustration. The paper wrapping does not stick, so that there is no loss of material. Forty-eight of these cartoned slabs are packed in a case.

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A comprehensive description of the protective appliances available for dealing with the many gas and dust hazards in industry was given in a paper read by Mr. J. Davidson Pratt, O.B.E., before the Birmingham Section of the Society of Chemical Industry on November 6.

Regent Exhibition Opens Dec. 12th

In our preliminary notice concerning the Exhibition of the Regent Advertising Club in these columns in August last, it was stated that this would be held at Bush House.

The venue has now been changed, and "Advertising of To-day and To-morrow" will be seen at the Dorland Hall, Lower Regent Street, London, from December 12 to 22. The Exhibition will be open from 9 a.m. to 9 p.m. daily, including Saturdays. Among the numerous interesting features already described in our previous note, will be "1934 Advertising with Suggested Typographical Improvements", "Photographs of Happiness", "New Packs for Old Products", Christmas designs of every kind, political posters from all over the world, suggestions for advertising campaigns which might profitably be undertaken by the British Government and by collective organisations, etc.

New ideas will be seen in the exhibit comprising original work by twelve world-famous creative individuals, and much interest will be aroused by "Important Advertising Developments of Recent Times" chosen by a selection committee composed of the following distinguished men: Sir Martin J. Melvin, Bart., Mr. Ivor Cooper, Mr. R. B. Fishenden, Mr. E. McKnight Kauffer, Dr. D. A. Spencer, D.I.C., Ph.D., F.R.P.S., A.I.C., and Mr. W. Leonard Hill (Chairman of the Regent Advertising Club).

Readers able to be in London at the time of the Exhibition are urged to see it, as they may be certain of getting an insight into up-to-the-minute advertising ideas.

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Readers will be interested to know that the address of the newly erected factory, warehouse, and office of Messrs. Alfa-Laval Co., Ltd., is Great West Road, Brentford, Middlesex. Telephone: Ealing 0116 (3 lines). Telegrams: Alfa-Laval, Phone, London.

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The Annual Lecture arranged by the Pioneer Society for the "Humane Slaughter of Animals and the Adequate Inspection of Meat under Hygienic Conditions" was given on Tuesday, November 27 at 5.30 p.m. at the Royal Sanitary Institute, Buckingham Palace Road, London, S.W. 1, by Sir Leonard Hill, M.B., LL.D., F.R.S.

The lecture, at the end of which questions were invited, was entitled "Electric Methods of Producing Humane Slaughter".

Lower Sugar Content of Continental Beet

According to a report just issued by the Czechoslovak Sugar Research Institute, the local sugar beets,

although larger in size than last year, are yielding less sugar than in 1933. The average weight of a root is given as 420 gm. (rather under 1 lb.), compared with 398 gm. in 1933 and with the average of 465 gm. for the preceding ten years. The sugar content is 16·12 per cent. (18·65 per cent. in 1933).

For the whole country only about 2 per cent. of the crops are described as very good, but 62 per cent. are considered good, 35 per cent. are given as fair, and 1 per cent. as bad. This year's Czechoslovak sugar production is below that of the 1932-1933 campaign. Exports are somewhat less, home consumption is about the same at some 350,000 tons —*i.e.*, roughly half the actual production. Considerable stocks remain on hand, while some sugar has been released to distilleries for the making of alcohol, and some has been used as animal fodder.

Estimates published by Dr. Mikusch of Vienna anticipate for 1934-1935 a total European sugar production of 7,944,000 tons, compared with the actual 1933-1934 yield of 7,196,000. England, in company with a number of other countries, continues to increase the annual production and gradually approaches a position of being self-supporting. Production appears to be declining in Denmark, Holland, and Sweden.

Conveyance Unit

The new "Sirocco" *portable* pneumatic conveyance unit may be employed for cleaning boiler flues, giving a saving in time and labour. Extracted material is delivered direct into a container for easy removal. It also finds application in sacking granular material from stock and in unloading barges, wagons, lorries, etc.

The plant is designed for operation by semi-skilled labour, and the portable nature of this new equipment naturally extends the services offered by the "Sirocco" system of pneumatic conveyance and opens up new possibilities in the handling of granular materials of all varieties.

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Technical Bulletins Nos. 211, 223, and 224 of the New York Agricultural Experiment Station at Geneva, N.Y., give the results of an exhaustive study of heat transfer rates for stainless steel and glass-lined steel and their effects on the properties of milk and cream.

Boiler Extensions

The additional boiler plant for the Hams Hall power station of the Birmingham Electric Supply can be divided into two sections—namely, a group of three powdered fuel fired boilers, and two stoker fired boilers.

Three International Combustion, Ltd.'s powdered fuel fired boilers are to be installed, each of a normal continuous evaporation of 250,000 lb. per hour, and to have a peak evaporation of 300,000 lb. per hour for a period of two hours. The steam pressure at the boiler stop valve will be 375 lb. per sq. in. at a temperature of 730° F., similar to the existing boilers, the temperature of the feed being 300° F.

Each boiler has its own independent stack, but dampers are to be provided so that the gases can be led to a flue which will be connected to an electrostatic precipitation plant. The latter will be the normal running procedure.

The two stoker fired boilers are also to be of normal evaporation of 250,000 lb. per hour, and a peak duty of 300,000 lb. per hour for two hours, and will be fitted with Usco travelling chain grate "L" type stokers, each being 31 ft. in width by 20 ft. in length supplied with preheated air.

Up-to-Date Labelling

Many exclusive features are claimed for their "Westminster" labelling machines by the makers, Messrs. Dewey and Almy, Ltd., Shellmex House, Strand, London.

The machines incorporate a new circulating lap-waste system, eliminating waste; they run at a very high speed (they can handle 350, or, if desired, more than 500, No. 2 cans per minute) and are capable of quick adjustment for different sizes of can; they use hot or cold pick-up adhesive, and are run on a simple transmission mechanism.

They will, say Messrs. Dewey and Almy, satisfy the most exacting requirements of the individual user.

Five Coats a Day

"Vigorised" paint, made up with linseed oil treated by a special process protected by patents, is claimed by the makers, R. I. Clark and Co. (associated with R. Gay and Co.), of 4, Carlton Gardens, London, S.W. 1, to be especially suitable for the decoration of factories, offices, and other large premises. The film does not dry by oxidation as does an ordinary paint, but by a physical change, hardening from the bottom upward, and this gives it the important advantage that it can be applied by spray "wet-on-wet", an interval of only one hour being necessary between each coat.

The "spot" test shows that the special "vigorised" oil stays in the paint and is not absorbed by the surface. The pore-closing properties of the paint are said to be unique; it is not the medium which keys to the surface, but the full-bodied paint.

Vigorised coatings are particularly valuable for exterior painting in bad weather, as within half an hour of application rain does not affect the film even though it is still wet. These materials are specially recommended for commercial and transport vehicles.

Tapping barrels of beer at the Brewers' Exhibition, recently held at the Agricultural Hall, Islington.

INFORMATION and ADVICE

Banana Essence—Coffee Extract—Cough Lozenges —"Home Made"—Bottle Capping—Engineering Uses of Silver—Beef and Ham Roll—Pickled Gherkins—Pickles—Vinegar for Pickles—Beetroot Storage — Mayonnaise — Worcester Sauce — French Mustard—Fruit Sauce—Kumquats—Mincemeat—Table Jellies — Lemon Curd — Lemon Cheese — Custard Powder — Junket Powder — Liqueur Chocolates

Banana Essence

1,711. *Kindly suggest a formula for a synthetic banana essence.* (Japan.)

The type of essence required will be determined to a great extent by the purpose for which it is to be used. If it is wanted for flavouring a syrup or beverage the constituents will have to be water-soluble. For confectionery and baking generally the solubility factor does not enter, and for such purposes a very good essence can be made from petitgrain oil, vanillin, and ethyl sebacate, with a very small proportion of clove and cinnamon oils to enhance the taste. The amounts of the various ingredients must be found by trial, as the ultimate effect of any given formula will depend upon the other ingredients present, and the temperature and time of baking. The essence should, in any case, be added at the last possible moment and subjected to the minimum of heat treatment, as the aroma is much impaired by heat.

A soluble essence is prepared by compounding various fruit esters, there being no known pure ester which constitutes the essence of the banana. Such a compound makes use of benzyl acetate and propionate, together with amyl butyrate, as its main constituents, and is not suitable for anything that needs to be baked. A formula which may give satisfaction is as follows:

Benzyl acetate	2 parts
Benzyl propionate	2 ,,
Ethyl butyrate	1 part
Amyl butyrate	2 parts
Amyl acetate	1 part
Orange oil	1 ,,
Lemon oil	1 ,,

These are mixed well together and added as required; variations in the quantities of the last two ingredients can be introduced to accord with local taste.

A fresh fruit flavour is often added, and serves to soften the otherwise slightly harsh flavour of the synthetic materials. This is done by macerating ripe banana pulp with double its weight of spirit, allowing to stand for three days, and lightly pressing out the extract, which is added as required to the ester mixture.

Coffee Extract

1,712. *I thank you for the recipe for coffee extract which you have supplied.*

How can we thicken this? (London and Manchester.)

The recipe supplied should give an output of about 7½ gallons. It would appear that you are using too much water for percolation. Gum tragacanth is not suitable for thickening, as it will make the extract opaque. Gum arabic is better; soak in water for 48 hours and then boil with the extract.

1,713. *Please supply a formula for making malted milk, and say whether spray or roller process milk may be used.* (Co. Waterford.)

The only really satisfactory way of tackling this matter is to get a qualified chemist to go into your case thoroughly and produce a sample for your approval.

Two names were suggested, and recommendations made as to sources of supply of plant.

1,714. *I wish to incorporate a vanilla essence in a food powder (principally desiccated milk). Would some kind of a hand sprayer be the most suitable method? If so, can you recommend a cheap one?* (Reading.)

There are several possible ways of effecting a uniform mixture. Perhaps the simplest is to use a combined mixer and spray type of machine, which is fitted with a spray device which enables the flavouring essence to be spread into the powder while it is being mixed in the body of the machine. Another way is to mix the essence with a portion of the whole batch of powder, and then place it in a hot room to dry slowly, after which it is ground, preferably in a roller mill. The product is then mixed with the rest of the material.

This might be done in several stages, depending on the amounts of material being handled. Another way is to spread out the powder and sprinkle over the essence. Then mix by hand and fill into paper bags which are stacked on shelves in the drying room for a week or ten

days, after which the material is passed through a roller mill and thoroughly mixed.

Cough Lozenges

1,715. *What is the secret in making voice and cough lozenges?* (England.)

We did not know there was a secret. Aniseed is usually the basis of such sweets, while other materials of medicinal value may be incorporated—*e.g.*, balsam of tolu, oil of cloves, menthol, eucalyptus, etc. The idea is to blend suitable oils, etc., with as pleasing a taste as possible but sufficiently powerful to act on the throat and chest. There are several varieties of cough sweets on the market, each of them having some characteristic flavour.

1,716. *Kindly let us have the names of reliable manufacturers or exporters of dried yeast for the baking trade.* (Tokyo.)

Suggestions were made.

1,717. *What is the readiest method of getting egg albumen into solution, and what is the best preservative for the solution?* (Cork.)

To get albumen into solution all that is required is to add the albumen to cold water without stirring, and allow it to stand overnight. The next morning stir well. Some people warm up the solution while stirring. It will then be found to have gone into solution.

As regards preservative, much depends on what the albumen is going to be used for. For instance, the type of preservative used in cases where the albumen is going to be employed in connection with foodstuffs will be different from other cases.

Our correspondent was supplied with the name and address of a firm having considerable experience of this subject.

"Home Made"

1,718. *We are about to have a label printed on the following lines, "Home Made Chutney". Would you be good enough to advise us if such a label would be considered legal in the use of the term "Home Made".* (England.)

Generally speaking, the use of the term "home made" applies to products sold at the establishment where they are manufactured, but the term has now been extended to imply a preparation made according to old-fashioned ideas, even though it may be made at a factory. As the enforcement of the Food and Drugs Act depends on the local authorities, it would be up to a local inspector or public analyst to take exception to a label, but generally no objection would probably be taken to a product which conformed, more or less, to what are recognised as standards of composition for preparations made in the home.

Bottle Capping

1,719. *Kindly give recipes for bottle capping solutions.* (England.)

It is best to use the viscose or gelatin caps supplied by manufacturers. There are numerous possible recipes which might be employed in cases where appearance does not matter and for special purposes. Naturally these will depend on the particular nature of job in hand. For instance, for one type of work the following might be found satisfactory:

I

Resin	20 parts
Ether	40 ,,
Collodion	60 ,,

Dissolve resin in ether and add collodion. The solution is highly inflammable. For use, warm in hot water or on hot plate preparatory to dipping.

II

White glue	1 part
Zinc white	1 ,,
Glycerin	1 ,, (or more if thin solution is desired)

Melt in glue-pot and add glycerin and then zinc white. Dip while the solution is hot.

Others may be made by using gelatin as a base. A simple one is a mixture of gelatin, glycerin, and water. Sometimes gum arabic, starch, and boric acid are used in place of glycerin.

Then, of course, there are the nitro-cellulose lacquers, using, for instance, an amyl acetate, acetone, and benzene mixture as the solvent.

Paraffin wax or mixtures of various other waxes are also used for sealing purposes.

1,720. *Required: Information concerning a machine for mixing fat with flour; information regarding manufacture of food drinks (details supplied).* (South Africa.)

This was sent.

Engineering Uses of Silver

1,721. 1. *In the manufacture of what foods is silver used and what specific processes?*

2. *Of what material is the equipment manufactured—that is, fine silver, sterling silver, or other alloy—and is the construction of the one material or is a plated or duplex metal used?*

3. *How large is the equipment?*

4. *Is the equipment in a given plant applied to one specific food process or the same apparatus used for a number of processes?*

5. *What are the names of the companies manufacturing the equipment and the names of those using it?*

6. *Is there any probability that the use of silver in cooking utensils would be increased if relatively low-priced duplex metal were available?* (Washington, U.S.A.)

Information was supplied.

1,722. *I should esteem it a favour if you would put some manufacturers of machinery, suitable for making calico and canvas bags, for salt, flour, etc., in touch with me.*

Machinery must be the most modern, and capable of cutting and printing (in two or more colours) in one operation if possible.

I am in touch with American makers, but prefer to buy British if possible. (Johannesburg.)

We are afraid that we do not know at present any firm interested in this matter. If any such will please communicate with us, we will at once put them in touch with our correspondent.

1,723. *I was interested in the account of transparent wrappings in the "Packing" section of "Food Industries Manual", and would be very grateful if you would be so good as to obtain for me particulars, with prices, of transparent, moisture-proof cellulose wrappings. I should require them for the packing of confectionery. I should be grateful, too, if you would be so good as to give me names and addresses of manufacturers of moisture-proof wrappings, transparent or otherwise.*

I should also like information regarding double-wall mandrel packing for sweets.

I am also looking for a light, attractive, air- and moisture-proof packing for coffee, roasted and ground, to be put up in one-pound packets. Perhaps you would kindly advise me if the above would be suitable.

Would you also be so good as to get me information regarding "Flexiglass", mentioned in the section above referred to? (N.E. Rhodesia.)

Information was supplied on all these points.

Beef and Ham Roll

1,724. *Kindly give recipe for beef and ham roll; also particulars of canning.* (Scotland.)

The following is suggested as a basis for your experiments:

Mildly cured lean beef	7 lb.
Boiled pork (lean)	3 ,,
Rusks (fine white)	2 ,,
Milk or equivalent powder	3 pints
Eggs	4 lb.
Pepper	1¼ oz.
Ground thyme	¼ ,,
Mace	¼ ,,

Chop beef and pork very fine, beat the eggs, add to rusks which have been soaked in milk. Chop finely and cook in round containers at 170° for two hours.

Bacon substituted for the pork will give a better flavour, though smoke powder is sometimes introduced satisfactorily.

With regard to canning the roll, as in the case of galantine, this is usually filled cold into the cans and exhausted either by mechanical vacuumising machine or by heat exhaust boxes. The former is the quickest and cleanest way of doing it. After this, sterilisation occupies about 90 to 120 minutes at 240° F. in the case of 3-lb. cans.

1,725. *Please give us recipes for first quality chicken, ham, and tongue; chicken and tongue, and chicken and ham pastes.* (Scotland.)

Two examples were given.

1,726. *While we have had a little success—in a small way—in bottling fresh herrings in glass jars in the same way as fruit is bottled, could you let us know the* correct *time for keeping them in heated water or steam, and at what temperature?*

We should be glad of this information before attempting any large-scale operations. (Sunderland.)

Advice was given.

Pickled Gherkins

1,727. *We import gherkins in brine, and after soaking them for 24 hours in running water, we pickle in a 4 per cent. solution of sweetened acetic acid; after being allowed to stand a week in this solution they are bottled and covered with a similar liquor, but coloured.*

During the last few weeks we have had several returned because when the jar has been opened the liquor has effervesced, and the gherkins have acquired a bitter flavour.

We shall be glad if you will let us know the cause of this and what you can suggest as a remedy. (England.)

You might use a little benzoate of soda in the water in which they are soaked, but the main thing to observe is that the sweetened liquor in which they are packed must show a 4½ per cent. content of acetic acid. Another point: Have the gherkins been properly brined?

Pickles

1,728. *Can you give us complete details of a short brining process for Dutch brown onions which will be effective in preventing fermentation and will give a crisp article of good flavour and colour?* (England.)

This was done.

Vinegar for Pickles

1,729. *In bottling of mixed pickles we use a 4½ per cent. malt vinegar. We have had complaints regarding the "sourness" of our pickles. Is it possible to sweeten the vinegar or treat it in any way so as to render it milder and more palatable? We state on our labels, "Prepared in Pure Malt Vinegar."* (Scotland.)

Most picklers sweeten their vinegar to-day, some more than others. One pound of white sugar to each gallon of vinegar is about normal.

Beetroot Storage

1,730. *We store considerable quantities of whole, cooked beetroot in barrels at this season for selling whole six months hence. The preserving liquor is 4½ per cent. acetic acid vinegar plus 2½ per cent. salt, and is added at boiling point to the barrel, which is then headed up. We find it difficult to get rid of the strong acidity when the beetroot comes to be used. Also there is a pronounced sourness due probably to slight fermentation after storing. Can you suggest another method of preservation and a liquor containing less acid?* (Scotland.)

We might suggest cutting down the acid content to 3 per cent. The amount of salt used seems all right. In addition, use a little benzoate of soda, say, 2 oz. to

the 50 gal. cask. When the beetroots are required the preservative must be washed off with water at about 160° to 180° F.

Mayonnaise

1,731. *Since becoming a subscriber to your magazine* FOOD MANUFACTURE *we have been particularly interested in the section marked "Information and Advice," and should be very glad to obtain your views on one of our products.*

We have been manufacturing mayonnaise, salad dressing, sandwich spread, and other cooked products for some years now, but have always had trouble with mayonnaise separating and going rancid after it is some four or five months old.

Our mayonnaise is a combination of high-grade salad oil, fresh eggs, white vinegar, salt, sugar, mustard, and paprika. It is carefully cooked, thoroughly mixed, and makes up into a product which has a big consumer appeal over here.

The difficulty is, however, that at the end of the year, after the salad season is over, there are always some stocks on the shelves which we have to take back owing to the fact that during the winter they go bad.

We believe that this is a common difficulty with many mayonnaise manufacturers, but are wondering whether you can give us some suggestion as to how this can be overcome. (Canada.)

Without having full details of your procedure it is difficult to do more than throw out a few general suggestions. You might try incorporating gum tragacanth, say, 1 lb. to 30 gal. of the dressing. Soak the gum overnight in about a gallon of vinegar and add another gallon next day.

You should give careful attention to the oil—especially olive oil—to delay the onset of rancidity. So far as possible, do not allow air to get to the oil. When stored in a cask, see that the tap is always tightly closed and that no dripping takes place. Do not return any drippings to the cask. Also, do not draw off the oil until you actually require it and do not draw off more than you require. If stored in tins or jars, these should be kept well closed. Storage should take place at a uniform temperature of 60° to 70° F. The same applies to the finished product; it should be filled and capped as soon as possible.

Equal attention should be given to the mixing or beating operation to avoid incorporation of air. Do you use a homogeniser? What is your order of adding the ingredients? These are questions having an important bearing on the stability of the product.

1,732. *Could you kindly let me know of a good recipe for mayonnaise?* (England.)

An example was supplied.

1,733. *How is gum tragacanth used in making up sauces, and what quantity is used for thickening?* (Manchester.)

We do not think we could do better than to refer you to the article on Sauces which appeared in the March, 1933, issue of this journal.

Worcester Sauce

1,734. *We are desirous of securing a formula for a good Worcester sauce, and would appreciate it if you could supply us with one.* (Chicago.)

The enquirer was referred to an article on this subject published in an American journal two years ago. Everything depends on the choice of the proper ingredients and on the methods of manipulation employed. The formula itself must be adjusted to the local tastes and prejudices, but as an indication of the general structure of such formulæ an example was given. It is always best—and, indeed, it is the only possible way to attain success—to secure the services of an experienced man or food chemist. Such a person would submit a sample and follow it up with arranging large-scale production and generally supervising manufacture. If the affair is to be anything more than back-kitchen cooking you cannot hope to develop a sauce—and particularly a Worcester sauce—business without the assistance of a good, experienced man. It will cost less in the long run than playing about with formulæ and text-book information.

1,735. *I am troubled with white mould growths on my tomato sauce. What precautions ought I to take to eliminate these?* (Middlesbrough.)

Suitable measures were outlined.

1,736. *We have been recommended to apply to you for a recipe for salad cream, and shall be greatly obliged if you can help us in this matter.* (London.)

We would suggest that you try the following recipe:

Whole egg	100	lb.
24 grain pale malt vinegar	12	gal.
Tarragon vinegar	6	,,
Olive oil	12	pints
Unsweetened condensed milk	1½	gal.
Sugar	14	lb.
Mustard	12	,,
Salt	5	,,

Raise the vinegar, sugar, and salt to 180° F. in pan and pass through a sieve. Mix the oil and mustard. Beat the eggs for half an hour in a warm beater. Add the oil and mustard. Then add the vinegar, sugar, and salt, and finally the tarragon vinegar. Heat gently to 175° F. and continue beating for about an hour. Add the condensed milk and pass through a homogeniser. Afterwards fill.

French Mustard

1,737. *Would you be good enough to let me know the formula for making French mustard?* (London.)

A recipe for trial was suggested, incorporating mustard, salt, anchovy essence, ground cumin seed, sherry wine, and malt vinegar.

Fruit Sauce

1,738. *Not having been too successful in manufacturing a cheap fruit sauce, I would be obliged if you could supply me with instructions as to formula and method of*

preparation. Also please supply a formula for gravy browning. (England.)

These were furnished.

1,739. (1) *Can you recommend a really first-class book on condiment manufacturing, including jam making, vinegar, and tomato sauce?*

(2) *We would much appreciate any information* re *the treatment, cooking, and canning of sweet corn, and also the names of any books on the subject.*

(3) *Could you supply information* re *the sulphurising of fruit pulps to keep them in condition for jam making, also what machinery would be required?* (Auckland.)

Information was supplied on all these points.

Kumquats

1,740. *Will you kindly inform me what is meant by Kumquats, Bastards, and Chumps?* (Germany.)

Kumquats (or cumquats) are the fruit of a small Japanese and Chinese shrub, *Fortunella* (Family Rutaceæ), closely allied to the orange and lemon and formerly placed under *Citrus japonica*. They are a variety of orange, in size and shape about equal to a large walnut, and are often preserved by stewing in their own juice with sugar added. They have a sweet rind and acid juice and are delicious in flavour. They can be obtained in the Chinese restaurants in London.

Bastards and chumps are names used for special sizes of gherkins (pfeffergürken). Gherkins may be classified according to the number contained in one kilogram; thus, 90 to 100, 80 to 90, 70 to 80, 60 to 70, 50 to 60, 40 to 50, and 30 to 40. If a kilo contains fewer than 30 to 40 they are called chumps; still larger are known as bastards.

1,741. *We are requiring information regarding the processes involved in the production of crystallised and glacé cherries.* (Liverpool.)

We think the best thing we could suggest would be to refer you to the articles in the November and December, 1933, and January, 1934, issues of this journal.

1,742. *We have received a request for information as to the potential marketing, in the United Kingdom, of powdered vegetables and fruits, including the following: (vegetables) celery, tomatoes, onions; (fruits) citrus and deciduous, also small fruits.*

We shall be glad if you will advise our enquirer of such firms as use powdered vegetables and fruits in the manufacture of their products. (London.)

We are afraid that what you ask would necessitate making out a list of the food manufacturers in this country, particularly those concerned with soups, sauces, and similar products, as practically every food manufacturer finds use for dried vegetables for the purpose of flavouring some of his products.

We do not think that we could do better than to advise you to insert a small advertisement in our columns about this matter.

1,743. *We should like to know what regulations there are regarding the use of rubber rings for fruit jars.* (Croydon.)

As far as we know there are no specific regulations.

It is left to the manufacturers to see that they are free from such compounding agents, colouring matter, or other chemicals which might contaminate any food packed in the container.

If such did occur to the extent of being detrimental to the health of the consumer, the public health authorities would come down on the manufacturer. Everything is in order as long as no detrimental effect is produced.

Mincemeat

1,744. *Can you tell me how to correct a fault in our mincemeat? It will persist in coming over the tops of the jars. Although all the ingredients are in perfect condition, it has the appearance of fermentation.* (England.)

In reply to your enquiry about mincemeat fermentation, I am afraid that it is difficult to give you anything of use, as one would first of all have to know more about the method you employ.

There are many possible ways in which infection, which causes fermentation, may occur.

For instance, there is the question of water. All water, of course, should be previously boiled to render it sterile. Do you wash the currants—if so, do you dry them after washing? Do you use any acetic acid or glycerin? How do you put the salt in the mincemeat? It is, of course, in any case absolutely necessary that all utensils, and even the hands, should be perfectly dry. Utensils and containers should have been thoroughly sterilised with hot water or steam and then afterwards dried in a hot room before use. Do you wet the cover before tying it down? One has to be specially careful about not using damp jars and storing or carrying out operations in a damp room.

Table Jellies

1,745. *As a consulting engineer I have to fit up an experimental plant for a client of mine for the making-up of samples of table jellies in rather heavy form, for export more than for England.*

I desire to get some information on the making-up of these foods, as the knowledge is essential for me in laying out the plant, including constituents, etc.

I trust that you will appreciate that as consulting engineers we have to acquire as much knowledge as possible from all quarters, and if you can help me in this matter, or quote any technical books on the subject, I would appreciate your reply. The jelly I have in mind is similar to the Chivers' and similar standard brands on the market.

The question of fruit syrups will also enter into this, so perhaps you could let me have the name and address of a company supplying same. (England.)

The enquirer is referred to previous articles we have published on this subject, especially to the ones in the present and in the September issues.

1,746. *We are seeking information on Pontefract Licorice Cakes, as we have an idea that an article of this sort can be introduced into the American market. We are not competitive in your market, neither do we do any export. We would appreciate any suggestions.* (Chicago.)

We are afraid that you are asking for information which is very closely guarded and kept secret, and we do not know anyone who would give you detailed practical instructions without adequate payment. In his book, *Sweet Manufacture*, Mr. N. F. Scarborough devotes a chapter to the subject of liquorice, and should therefore be able to assist you in a general way.

Lemon Curd

1,747. *Would you kindly supply us with a recipe and method for making lemon curd for bakers and confectioners that will neither crack nor run in baking?* (England.)

Suggestions were made. The subject has been previously dealt with.

Lemon Cheese

1,748. *We should be pleased to have a recipe for the making of lemon cheese and orange cream.*

We are making considerable quantities of lemon cheese, but have difficulty with the keeping quality. Can you tell us how to overcome this difficulty?

We are also in need of thin cardboard boxes for packing butter. Can you give us the name of a firm who can supply these? (England.)

The required information was given. It should, however, be pointed out that we have published such information on previous occasions.

1,749. *We have been informed that Messrs. Hestavox, Ltd., furnish machines, such as peeling, halving, and brining machines, for extracting juice from citrus fruits.*

We are wondering whether you could possibly discover whether these people have a London office. If so, we should esteem it a favour if you will let us have their address. (London.)

We have been unable to trace this firm, and should be glad if any of our readers knowing anything about them would communicate with us.

1,750. *I shall be glad if you could let me know the difference between an emulsifier and a homogeniser, and also which in your opinion would be most suitable for manufacturing a synthetic cream for sale to the baking trade.*

Could you also let me have recipe for making such creams and the names of manufacturers producing these machines? (Hove.)

This information was supplied.

1,751. *I should be thankful to you for a list of names and addresses of agents carrying stocks of box printing, label printing, and cutting plants.* (London.)

This was sent.

Custard Powder

1,752. *Please furnish particulars of the preparation of custard powders.* (England.)

This information was supplied. We have, however, published matter on previous occasions.

Junket Powder

1,753. *Kindly let us have a recipe for junket powder.* (London.)

I am afraid that I have no very precise information about junket powders, except that probably they are made from a very weak dried rennet which is mixed with a certain amount of salt, sugar, and flavouring. The mixture is then dried under vacuum. Another view is that some, at any rate, consist of dried cream mixed with dried papain or rennet with added sugar and nutmeg.

We have an article, to be published shortly, on the manufacture of rennet, including dry rennet.

In this connection the following note on British Patent 401,395 may prove interesting. In making junket powders which consist of sugar, rennet or pepsin, and flavouring and colouring substances, a small amount—*i.e.*, 0·1 to 1 per cent.—of an edible salt which will restore to heated milk the properties destroyed by precipitation of the calcium content due to heating is added to the powder. Preferably calcium lactate or other edible calcium salt is employed, but magnesium citrate or other magnesium salts may be used. When used with unheated milk the powder gives more rapid setting.

1,754. *As subscribers to* FOOD MANUFACTURE *we write to know whether you can indicate from whom we could obtain maleic acid. According to the article "Retarding Rancidity" in the July, 1934, issue (page 258) this product has the property of retarding rancidity in fats.*

We should also be obliged if you would let us know whether maleic acid is harmless and can be used in the production of biscuits and crackers. (Buenos Aires.)

Our correspondents were put in touch with suppliers.

1,755. *I am carrying out some experimental work, and in this connection I require a fat (animal or vegetable) which is friable and fine enough to mix in the powder form. In order that the prepared article is a commercial proposition the fat should be reasonably cheap. Most fats I have tried are too damp, not solid enough, and not easily mixed with the powder I have in mind.* (Cornwall.)

Suggestions were made.

Liqueur Chocolates

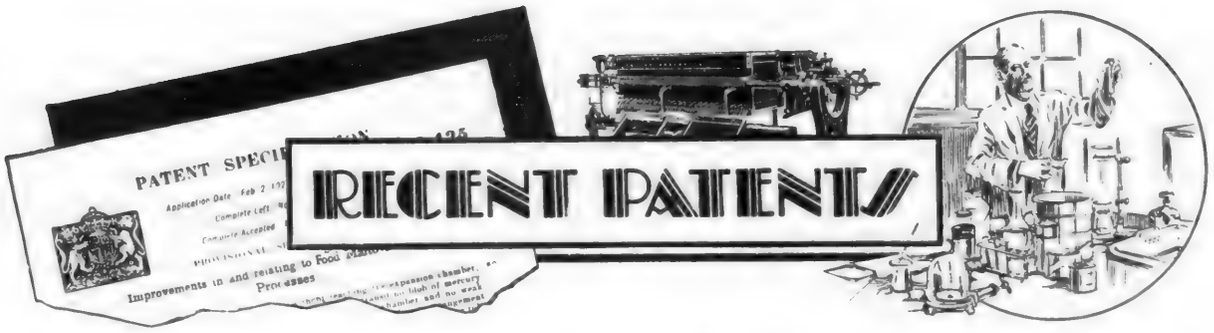
1,756. *Will you kindly give details of the manufacture of liqueur chocolates?* (Yorkshire.)

We have in hand an article on this subject which will be published as soon as space permits.

1,757. *We are interested in question No.* 1,630 (*a "filling medium" was required to add to a concentrated orange juice in order to solidify the mixture sufficiently so that it could be used as a filling for chocolates*) *and the answer as quoted in the current issue, and shall be glad if you would give us the information you gave to your enquirers, and oblige.* (London.)

This was done.

(In spite of the fact that "Information and Advice" has been extended to six pages in the present issue, it has still been necessary to hold over a considerable amount of interesting material, comprising Enquiries 1758-1771, until January, 1935.)



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

28562. PEHRSSON, J. M., and PEHRSSON, R. V.: Preserving substances. October 5.
28615. IMPERIAL CHEMICAL INDUSTRIES, LTD., AND SLADE, R. E.: Manufacture of foods for animals. October 5.
28652. HANSEN, D. A.: Utilisation of whale meat. October 6. (Norway, October 11, 1933.)
28657, 28658. BERKEL AND PARNALL'S SLICING MACHINE MANUFACTURING CO., LTD. (MAATSCHAPPIJ VAN BERKEL'S PATENT NAAMLOOZE VENNOOTSCHAP): Slicing machine. October 6.
28727. HUTCHEON, M.: Means for mashing potatoes. October 8.
28888. DICKINSON AND CO., LTD., J.: Drinking-straws. October 9.
28941. JEPHCOTT, H.: Cereal food products. October 9.
29775. LAWSON, A.: Apparatus for lining bakers' shapes. October 18.
30038. VEREINIGT MAUTNER MARKHOF'SCHE PRESSHEFE FABRIKEN, and SZILVINYI, A.: Production of yeast. October 19. (Austria, October 19, 1933.)
30039. VEREINIGTE MAUTNER MARKHOF'SCHE PRESSHEFE FABRIKEN, and SZILVINYI, A.: Production of yeast. October 19. (Austria, August 19.) (Cognate with 30038.)
30729. STANDARD BRANDS, INC.: Apparatus for canning eggs. October 26. (United States, February 13.)
30775. LEVINSON, A. A.: Preparing decolorised flavouring material. October 26.
30921. TRIGGS, W. W. (KRAFT-PHENIX CHEESE CORPORATION): Preparing whey concentrates. October 27.
30975. PEHRSON, J. M., and PEHRSON, R. V.: Treating fish, etc. October 29.
31243. WEBSTER, R. W.: Pasteurisers for foodstuffs in bottles, etc. October 31.
31261. HALL LABORATORIES, INC.: Treatment of milk, etc. October 31. (United States, November 10, 1933.)
31287. MACILWAINE, A. W.: Treatment of cocoa beans. October 31.

Complete Specifications Accepted

417,300. FINKEL, J.: Method of producing flour.
417,490. ZOELLY, H.: Preservation of comestibles in closed vessels. (Convention date not granted.)
417,506. LEE, H. G.: Preserving of root vegetables.
417,551. BAYERISCHE MILVERSORGUNG GES. MIT DEM SITZ IN NÜRNBERG: Process for drying milk. (February 3, 1933.)
417,552. METALLGES. AKT.-GES., and DATZ, A.: Production of stable mixtures containing vegetable lecithin with or without soya oil.
417,681. PHILLIPS, C. L. E. O. H. T.: Machines for making artificial cream. (Addition to 381,078.)
417,756. VICKERS, H.: Manufacture of meat rolls.
417,834. HOLZHYDROLYSE AKT.-GES.: Process for making crystalline sugar from wood sugar solutions.
417,852. VICARS, LTD., T. AND T., and CROSLAND, A. M.: Dough-rolling machines for the manufacture of biscuits or the like.
417,887. BEISSER, C.: Devices for pickling meat with the aid of pickling-brine to be introduced into the latter.
417,993. STEVENS, A. H. (PFAUDLER CO.): Method and apparatus for pasteurising, deodorising, or similarly treating milk or like liquids.
417,998. LOY, R., MARKUS, O., and HEATH, C. S.: Apparatus for drying coffee beans or other granular or farinaceous materials.
418,041. REAVELL, J. A.: Process of and plant for producing dried fruit and vegetable products. (Cognate Application, 25236/33.)
418,127. NEIDZWIEDZ, B. C.: Method of preservation of liquids and other perishable substances.
418,151. HALL, A. A.: Machines for moulding dough and like plastic substances.
418,211. STANDARD BRANDS, INC.: Invertase preparations.
418,364. BURR, W. F., and GRIGGS, V. H.: Process for delaying fermentation and putrefaction in perishable organic matter. (Cognate Application, 10132/33.)
418,591. MURRAY DEODORISERS, LIMITED: Method of and apparatus for pasteurising and deodorising lacteal liquids. (Cognate Applications, 11934/33 and 13741/34.)

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per group volume, or in bound volumes price 2s. each.

413,285. **Soluble dried egg product.** ENDOWMENT FOUNDATION, 390, George Street, New Brunswick, New Jersey, U.S.A.
By emulsifying the egg mass with a very much larger proportion of water than is customary and subsequently drying at a temperature well below 212° F. a dry product is obtained which, according to the specification, is readily soluble and exhibits superior keeping qualities. Incorporation of at least 100 per cent. of water leads to a very fine state of subdivision of the fatty matter. Furthermore, the diluted protein material forms a protective film round these fine globules of fat, which are thereby protected against contact with the heated atmosphere of the drying chamber. By spray-drying, moisture is rapidly removed from the protein film, the powder collecting on the floor of the heated chamber in the substantially dry condition. Other factors retarding the coagulation of the albumen, and so maintaining its solubility, are the reduction in the hydrogen ion and salt concentration brought about by the high proportion of water present. No special apparatus is required for the process, the mixture of good quality egg mass with 100 to 150 per cent. by weight of water being incorporated in the usual type of homogeniser or propeller type of beater. The emulsified mass is strained through cheese cloth or the like before spraying into the hot chamber. (Convention date, U.S.A., February 11, 1932.)

414,971. **Packing foodstuffs.** DIAMINTS, LTD., Black Swan Yard, Bermondsey Street, and RUSSELL, R., 101, Palace Road, Tulse Hill, both in London.
A packing for food and similar material, especially confectionery, comprises a cardboard carton or skillet having a line consisting of a composite sheet formed from metal foil, preferably tin or

aluminium foil backed by a sheet of moisture resistant paper or other substance. The carton may be provided with an external paper wrapper which may carry printed matter and be varnished and sealed. The liner is placed within the skillet before filling with the confectionery.

415,868. **Stable fruit juice suspensions.** POMOSIN-WERKE GES. SCHMICKSTRASSE 45, Frankfort-on-Main.

The "breaking" of solid dispersed particles in beverages (*i.e.*, settlement of heavy particles and surface floating of light particles) is claimed to be eliminated by so adjusting the proportions of pectin, sugar, and acid that only micelle filaments are produced during the liquid phase of suspension. When so adjusted, gelling does not occur at any stage. As applied to beverages comprising fruit pulps suspended in lemon, orange, currant, raspberry, and similar juices, the desired formation is achieved by adding 0·5 per cent. of dry pectin (or the equivalent amount of solution) to the fruit juice prior to stirring in the sugar. The total quantity of the latter should amount to 45 per cent. Finally the acidity is adjusted to a strength of 0·3 per cent. In the case of orangeade and lemon syrups with a 60 per cent. sugar content the desired effect is brought about by adding 1 per cent. of a pectin extract of 8 to 10 per cent. concentration, which is stirred into the cold sugar solution of the fruit syrup. As before, the acidity is finally adjusted to 0·3 per cent. Marked thickening will then occur on allowing the mass to stand for a few hours, whereupon the solid particles are stirred up and will then remain in permanent suspension. Another advantage of the pectin is its retarding effect upon sugar crystallisation. (Convention date, Germany, June 20, 1932.)

416,652. **Avoiding gelation during inspissation of fruit juices.** CONSERVENFABRIK LENZBURG, Niederlenzerkirchweg 735, Lenzburg, Aargau, Switzerland.

The essential feature of the process described is prolonged carbon dioxide treatment of the juice under pressure. The anti-gelling action is assumed to arise from reaction between the gas and the alkaline promoters of gelling normally present in the juice. The treatment is carried out for at least sixty hours under a pressure of 4 to 6 atmospheres in a special apparatus. In the latter a juice-impregnating pulp is connected to a juice supply pipe and also to a carbon dioxide supply. After impregnation with carbon dioxide the juice is transferred to a pressure vessel for the requisite period.

NEW COMPANIES

BRITISH GROWERS AND PRESERVERS, LIMITED. Monument Station Building, King William Street, E.C. 4. To carry on the bus. of growers and preservers of fruits, vegetables, etc. Nom. Cap.: £2,000.

BUCKROSE PRODUCTS, LIMITED. The Mill House, Nafferton, East Yorkshire. To carry on the bus. of mnfrs. of and dlrs. in baking and cooking powders, etc. Nom. Cap.: £1,500.

CONFECTIONERY PRODUCTS, LIMITED. Pomeroy House, 28a, Basinghall Street, E.C. 2. To carry on the bus. of mnfng. and wholesale confectioners, etc. Nom. Cap.: £100.

FITTON, CONFECTIONS OF MERIT, LIMITED. To carry on the bus. of mnfrs. of and dlrs. in foodstuffs, flour, sugar, etc. Nom. Cap.: £100. Subs.: W. B. Crouch, 116, Chancery Lane, W.C. 2; P. O. Ansell, 14, High View Gardens, Potters Bar, Middlesex.

JAMES AND REYNOLDS, LIMITED. Liverpool Chambers, Liverpool Gardens, Worthing. To carry on the bus. of mnfng. confectioners, etc. Nom. Cap.: £1,000.

K. C. CONFECTIONERS, LIMITED. 239, High Road, Kilburn, N.W. 9. To carry on the bus. of confectioners, etc. Nom. Cap.: £500.

LIVERPOOL ICE-CREAM SUPPLIES, LIMITED. 67, Lord Street, Liverpool, 2. To carry on the bus. of mnfrs. of and dlrs. in ice-cream, etc. Nom. Cap.: £500.

MIXAVITE, LIMITED. 120, Victoria Street, S.W. 1. To take over the bus. of mnfrs. and sellers of dog foods, etc., cd. on at Tonbridge, Kent, as "Geo. Freeland and Sons." Nom. Cap.: £5,000 in £1 shares.

M.M.M. (MUSHROOMS), LIMITED. 126, Long Acre, W.C. 2. To take over the bus. of the British Mushroom Cultivation Co. cd. on at Long Acre, W.C. Nom. Cap.: £12,000.

P.O.P. ICES, LIMITED. 40-42, Southwold Road, Clapton, E. 5. To carry on the bus. of mnfrs. of and dlrs. in ice-cream, etc. Nom. Cap.: £1,000.

POTATO SNAP COMPANY, LIMITED. Claremont, 25, Oxbarn Avenue, Wolverhampton. To carry on the bus. of mnfrs. of edible foodstuffs, particularly potato crisps, etc. Nom. Cap.: £2,000.

PREPARED PURE FOODS (LEEDS), LIMITED. To take over the bus. of prepared foodstuff mnfrs. cd. on by F. W. Broadbent and J. B. Glossop at 108, Upper Wortley Road, Wortley, Leeds. Nom. Cap.: £2,000.

SOUTH DEVON MINERAL WATER COMPANY, LIMITED. St. John's Chambers, Lower Terrace, Torquay. To take over the bus. of a mineral water mnfr. cd. on by A. Watson at Torquay. Nom. Cap.: £4,525.

W. H. CLARK AND SONS (MOOR), LIMITED. To take over the bus. of fruit bottlers and canners, etc., cd. on at Moor, Pershore, Worcs., as "W. H. Clark and Sons." Nom. Cap.: £1,500.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

An attractive Peek, Frean's window display which is being used by many grocers in connection with the Christmas trade.

RECENT TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

BEVAMIN.—554,337. **Substances used as food or as ingredients in food.** ALFRED DEHEZ, 2, Oak Hill Road, Surbiton, Surrey. October 24.

BLOSSOM TIME.—554,362. **Fish, fruits, vegetables (for food), and meats.** BALFOUR, GUTHRIE AND CO., LTD., 351, California Street, San Francisco, California, United States of America. November 7.

Registration No. 483,078 (2581) will be cancelled if and before the applicants' mark is registered.

BOSLEY.—552,652. **Fresh meat for retail sale only.** PETER YATES, trading as Yates Bros. and Company, Wine Lodge, Southall Street, Manchester; and Harrington Arms, Bosley. November 14. (By Consent.)

Registration of this trade mark shall give no right to the exclusive use of the word "Bosley".

CAKETTI.—550,860. **Chocolate and cocoa and other foodstuffs containing chocolate or cocoa.** W. S. SHUTTLEWORTH AND CO., LTD., 15, Galleywall Road, South Bermondsey, London, S.E. 16. November 7. (By Consent.)

CLICKETY CLICKS.—553,972. **Substances used as food or as ingredients in food.** ROBERTSON AND WOODCOCK, LTD., Trebor Works, Katherine Road, London, E. 7. November 7.

FLEVO.—554,507. **Condensed milk and milk powder (for food).** LEENDERT DIRK SCHAAP, Villa "De Paddestoel", Paddestoelweg Lb 69, Nunspeet, Holland. November 14.

KAYOVA.—554,289. **Sweetmeats.** THE "K" CONFECTIONERY CO., LTD., Hudson Road, Harehills, Leeds. October 24.

LANCASHIRE LASS.—554,069. **Milk, cream, condensed milk, cheese, butter, and milk products (for food).** TOKIO CREAMERY CO., LTD., Barnacre, Garstang, Lancashire. October 24.

The applicants undertake to use the mark only on goods produced in Lancashire.

LEGACY.—552,480. **Canned fish, canned fruits, and canned vegetables.** SALE TILNEY AND CO., LTD., 3, Lloyd's Avenue, London, E.C. 3. October 24. (By Consent.)

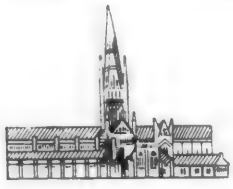
LINDT.—551,197. **Chocolate and cocoa.** LINDT (ENGLAND), LTD., 5, Camomile Street, London, E.C. 3. October 24. (Associated.)

Advertised before acceptance, the applicants alleging distinctiveness.

MAGNALBA.—553,206. **Substances used as ingredients in food as bread improvers.** BRITISH MERCHANTS INCORPORATED, LTD., 32, Lime Street, London, E.C. 3, and Deback Deutsche Backmittel-Gesellschaft mit Beschränkter Haftung, Wendenstrasse 155-157, Hamburg, Germany. November 7.

MANOR HOUSE.—553,162. **Jams, marmalade, bottled, canned, and dried fruits, bottled, canned, and dried vegetables, tinned meat, tinned fish, bacon, cereals (for food), flour, cheese, sugar, tea, coffee, cocoa, baking powder, custard powder, table jellies, cake mixtures, spices, salt (for food), sauces, syrup (not alcoholic and not medicinal), treacle, candied peel, starch (for food), and vinegar.** JOHN CROOK AND SONS, LTD., Colonial Buildings, Corporation Street, Preston. October 24.

553,839. **Preserved and potted meats.** DONALD COOK AND SON, LTD., 19 and 20, West Smithfield, London, E.C. 1. October 24.



PREXYL.—554,155. **All goods in Class 42, which includes substances used as food or as ingredients in food.** S. H. PERRY AND CO., LTD., 63 and 65, Victoria Street, Liverpool. October 31.

SELEX.—553,973. **Edible oils and edible fats.** THE PROCTOR AND GAMBLE COMPANY, corner of 6th and Main Streets, Cincinnati, Ohio, United States of America. October 24. (Associated.)

SHADY TREES.—553,283. **Substances used as food or as ingredients in food, but not including tinned pineapple and not including any goods of a like kind to tinned pineapple.** A. MATHEWS AND SKAILES, LTD., 30, Denman Street, London Bridge, London, S.E. 1. October 24.

WUNCHY.—554,264. **Substances used as food or as ingredients in food.** WALLER AND HARTLEY, LTD., 7, Birley Street, Blackpool. November 7. (Associated.)

YOUTH.—554,278. **Cocoa, chocolate, chocolate biscuits, and confectionery.** CADBURY BROTHERS, LTD., Bournville, Birmingham. November 7.

NICKEL AND FOODSTUFFS

SEVERAL paragraphs in a recent issue of *The Nickel Bulletin* will be of interest to food manufacturers.

In an abstract of an article dealing with the firm of H. J. Heinz Co., Ltd., it is revealed that in a large new building constructed for the manufacture of eighteen varieties of soup, at the rate of many millions of tons per year, all kettles in which the soups are made are of pure nickel, and pipes through which the soups pass from one process to another are of nickel-chromium corrosion-resisting steel.

In another article abstracted, it was stated to have been shown that nickel had only a very slightly modifying influence on the susceptibility of milk fat to oxidation, and austenitic steel was entirely without adverse effect.

A paper dealing with the engineering aspects of the handling of beer emphasises the vital importance of the selection of suitable materials for pipes and other parts handling the beverage at various stages of processing and delivery. Attention is directed to the hygienic unsuitability of lead as a piping material, and to the obvious objections to the use of rubber or glass. As a means of overcoming the difficulties inherent in these materials, and as a safeguard for the purity and general condition of the product, Monel metal piping has been introduced and is giving highly satisfactory results.

Extensive tests have been carried out at the National Fruit and Cider Institute to determine the relative suitability of various metals and alloys for handling the apple juice and other constituents of cider. In all cases nickel was without effect on the flavour of the cider, no evidence was found of visible attack by the cider on the metal, and no nickel was found in the test solutions. These were varied to include all grades of cider and also synthetic compositions simulating cider.

With regard to alloys, the tests reveal the outstanding suitability of nickel-chromium corrosion-resisting steels for handling all types of cider studied. Austenitic cast-irons were also satisfactory in their resistance to cider of widely differing compositions, and cupro-nickel showed good resistance to the four types of cider to which it was subjected.

PHOTOGRAPHS OF LEICESTER

We should like to draw the attention of our readers to the three greatly enlarged special Convention Issues of our associated journal, The Food Industries Weekly, *which appeared on November 2nd, 9th, and 16th. The Leicester Canning Exhibition was very fully covered by "F.I.W.", the newspaper of the food industries, and no fewer than 26 photographs of the Exhibition together with numerous caricatures of leading personalities and a special Canning Line Supplement appeared in these three issues. The social side was fully represented, and numerous feature articles dealt with all aspects of the Exhibition and their bearing on the industries represented at the show.*

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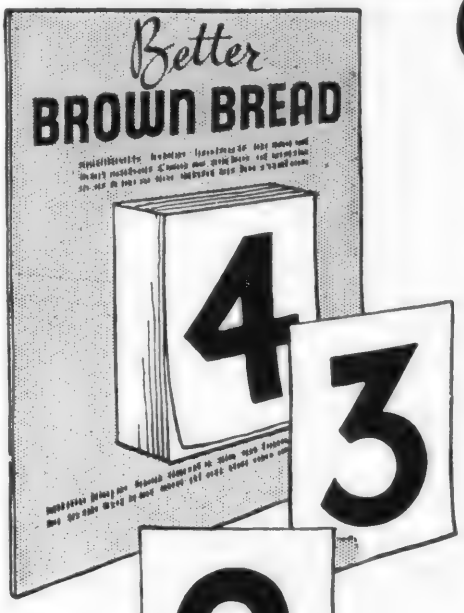

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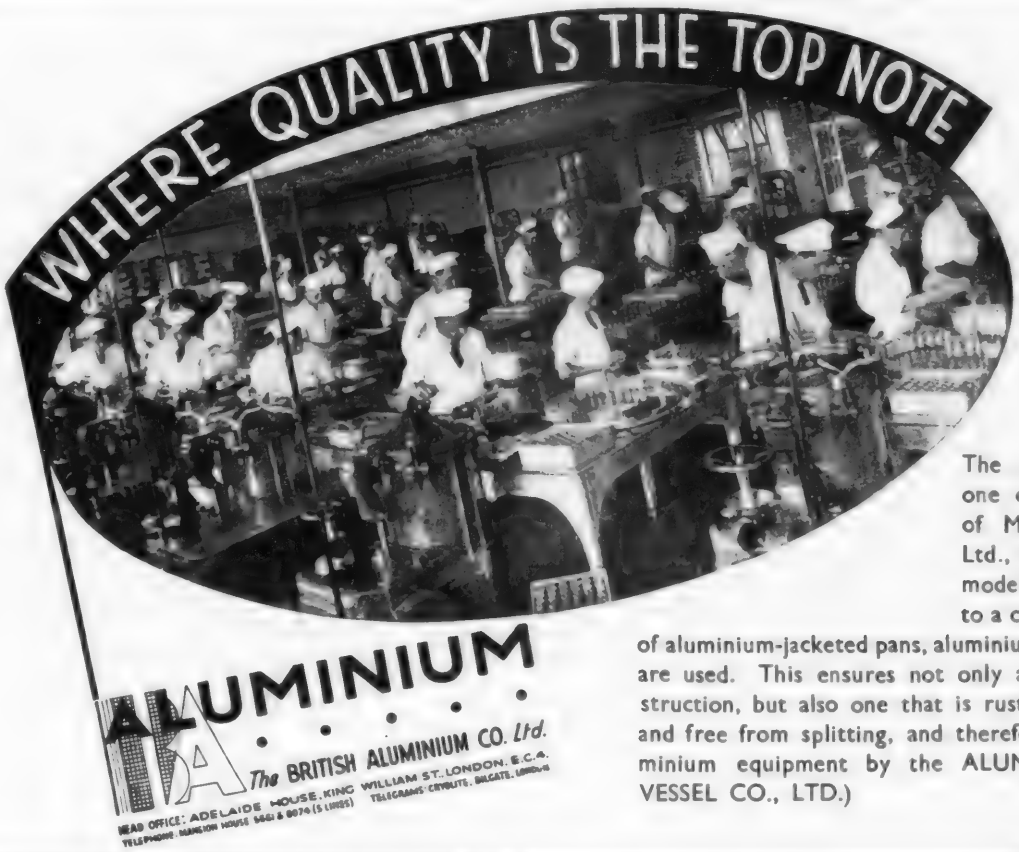
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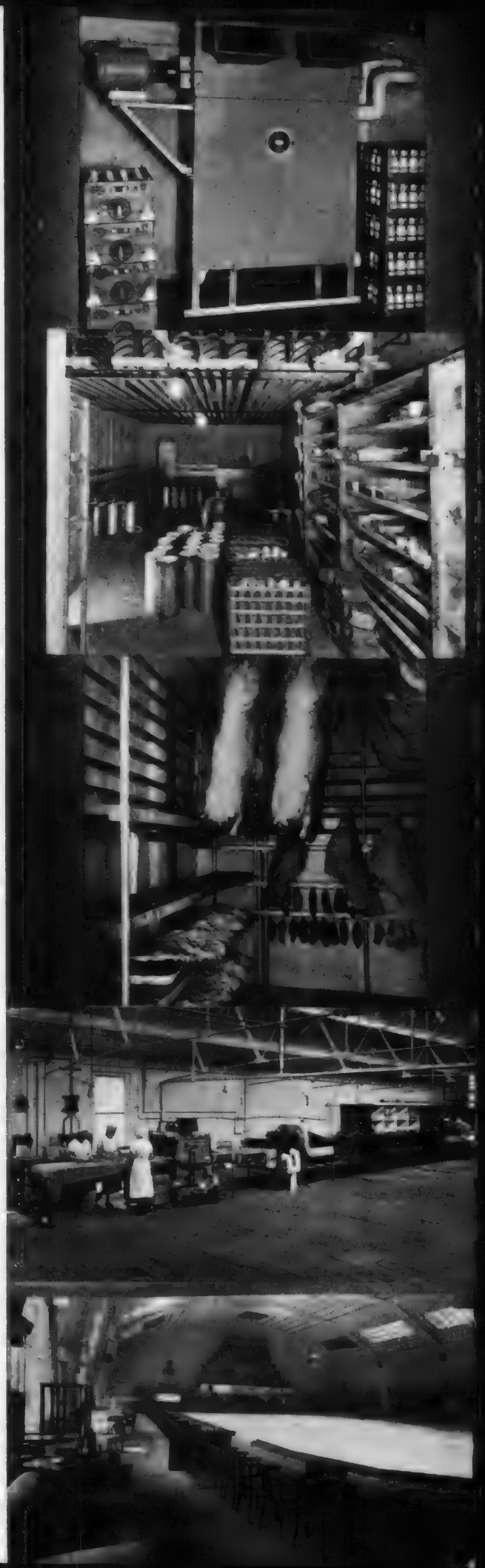

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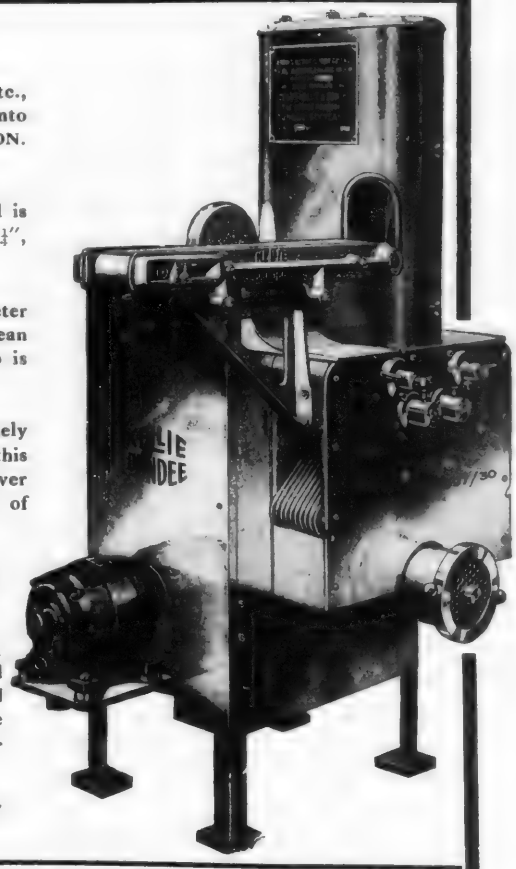

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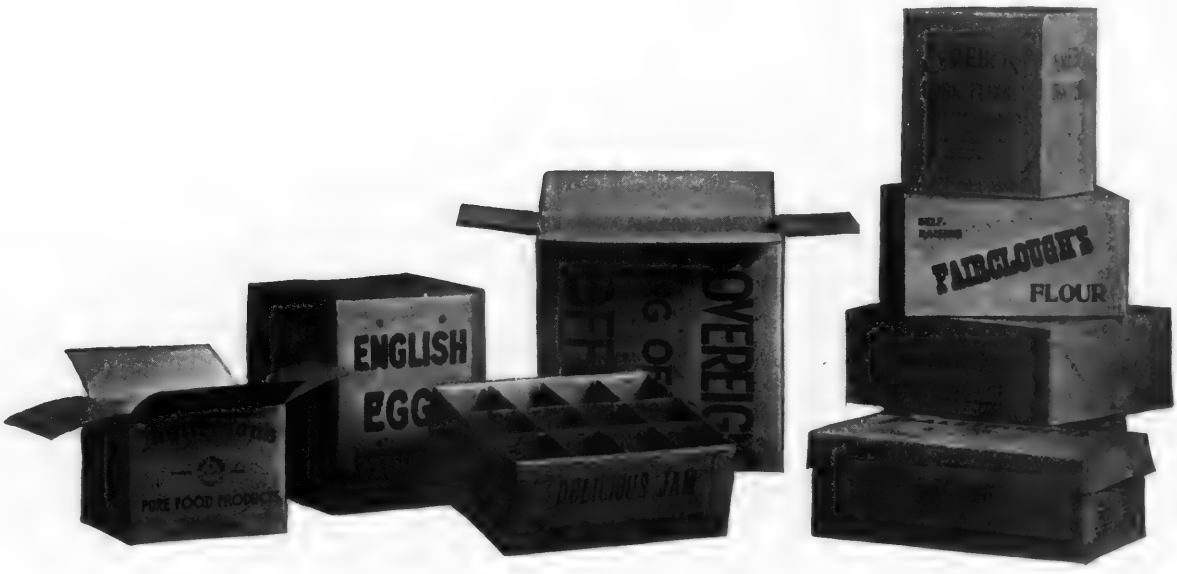

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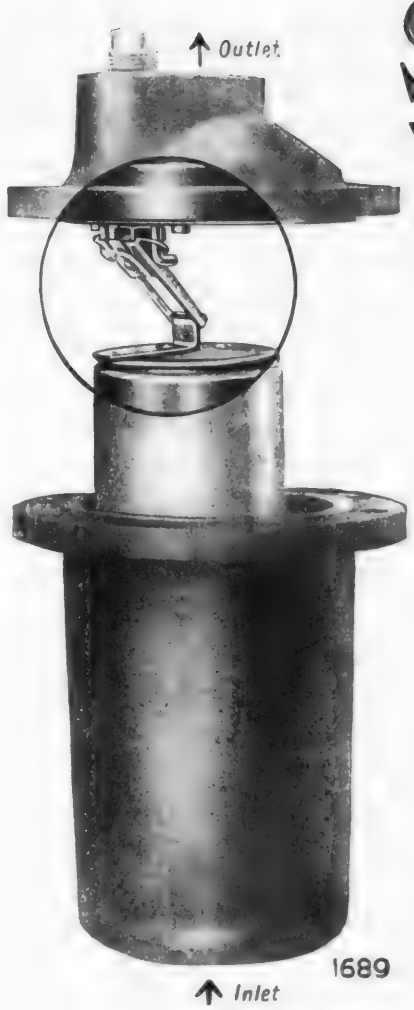

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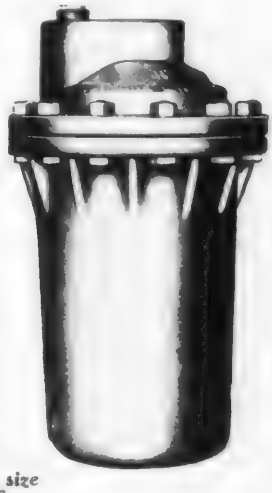

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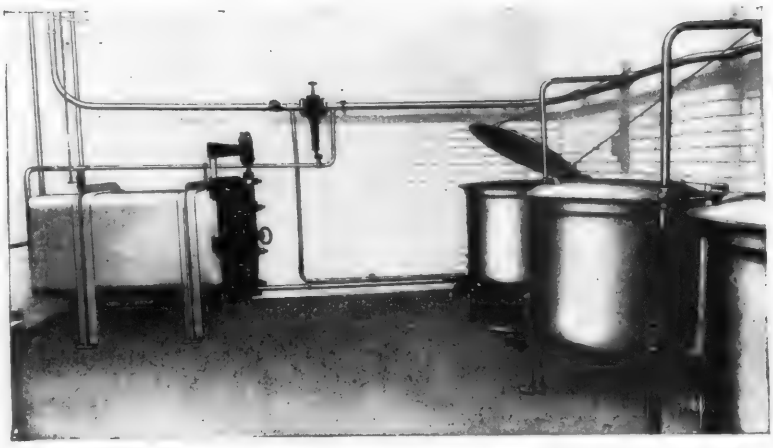

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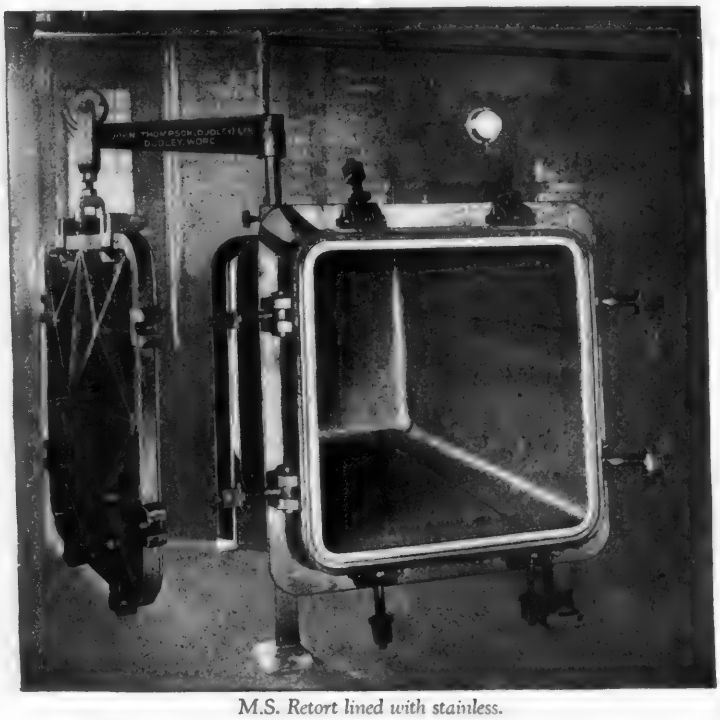

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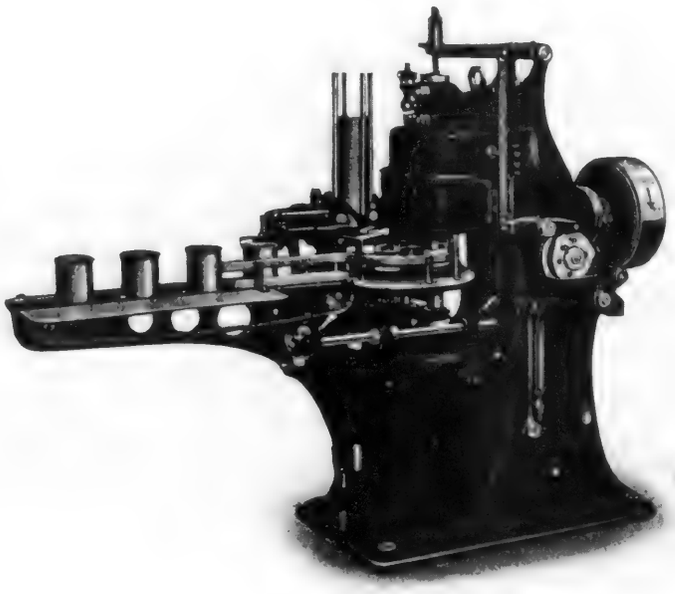

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15,000 cans per hour !

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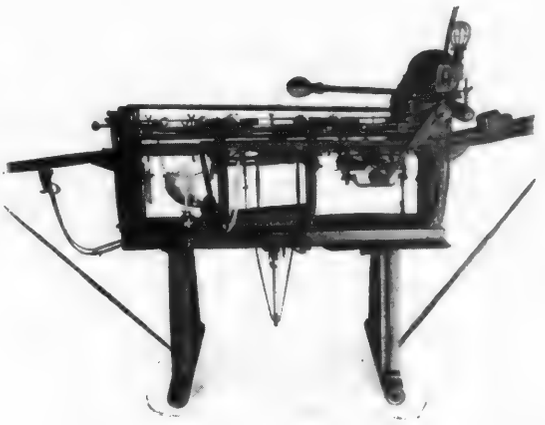

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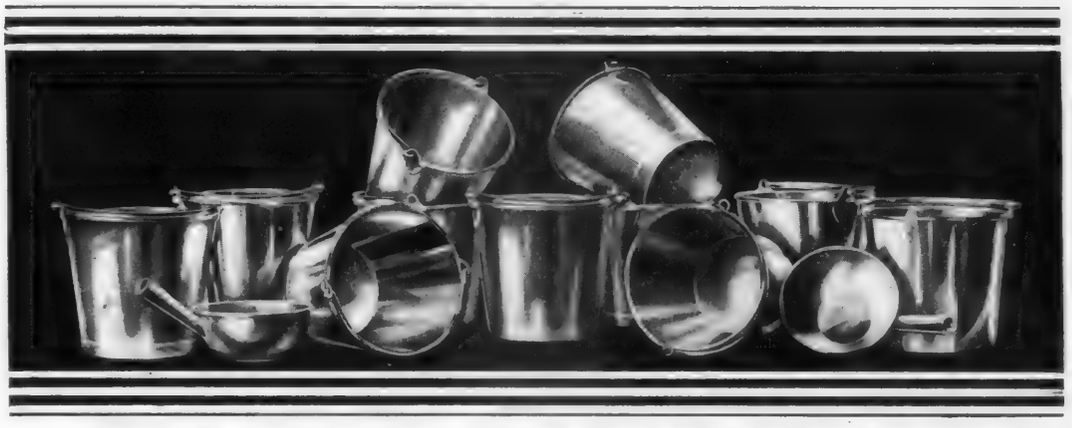
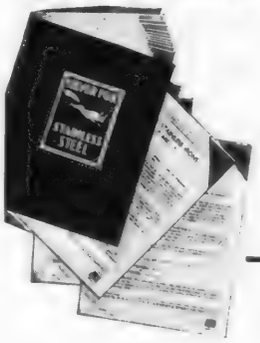


"SILVER FOX" STAINLESS STEELS

FOR THE FOOD INDUSTRY



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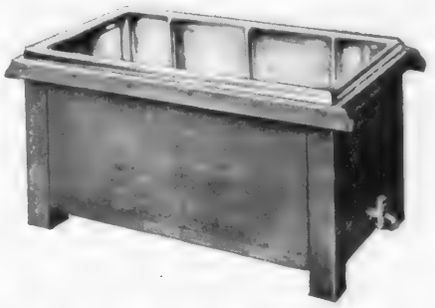

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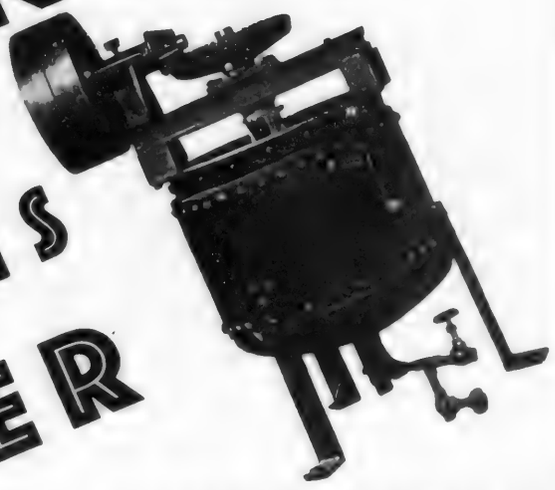

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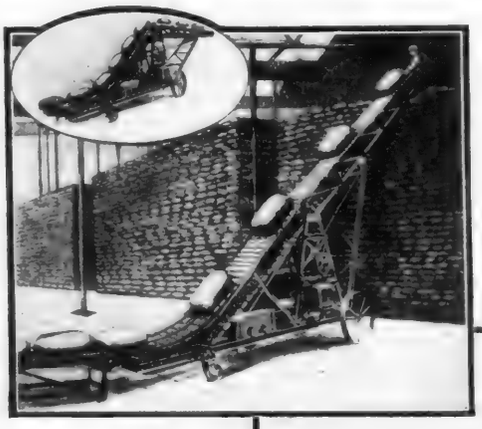

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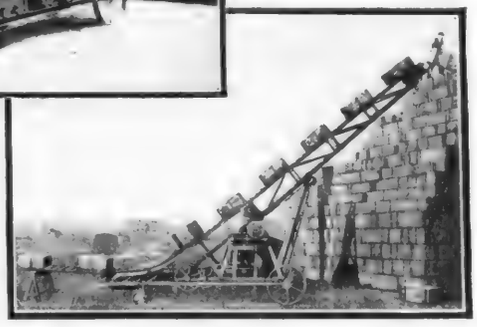

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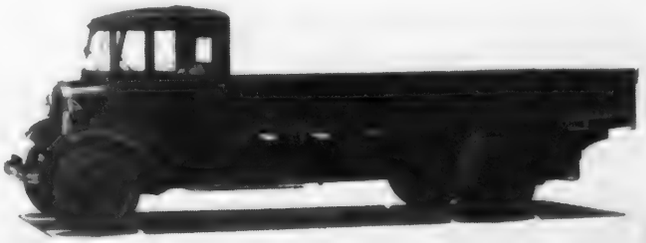

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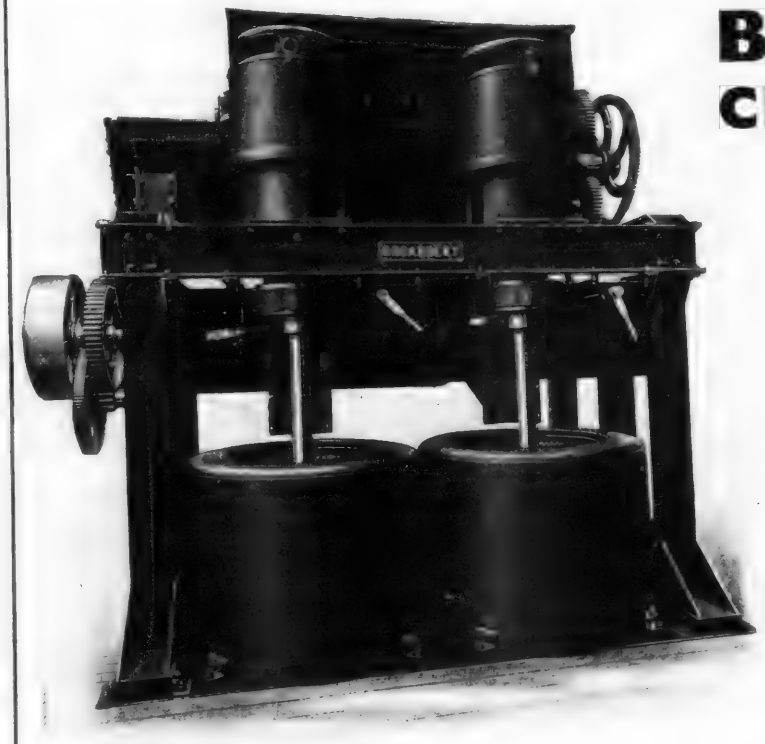

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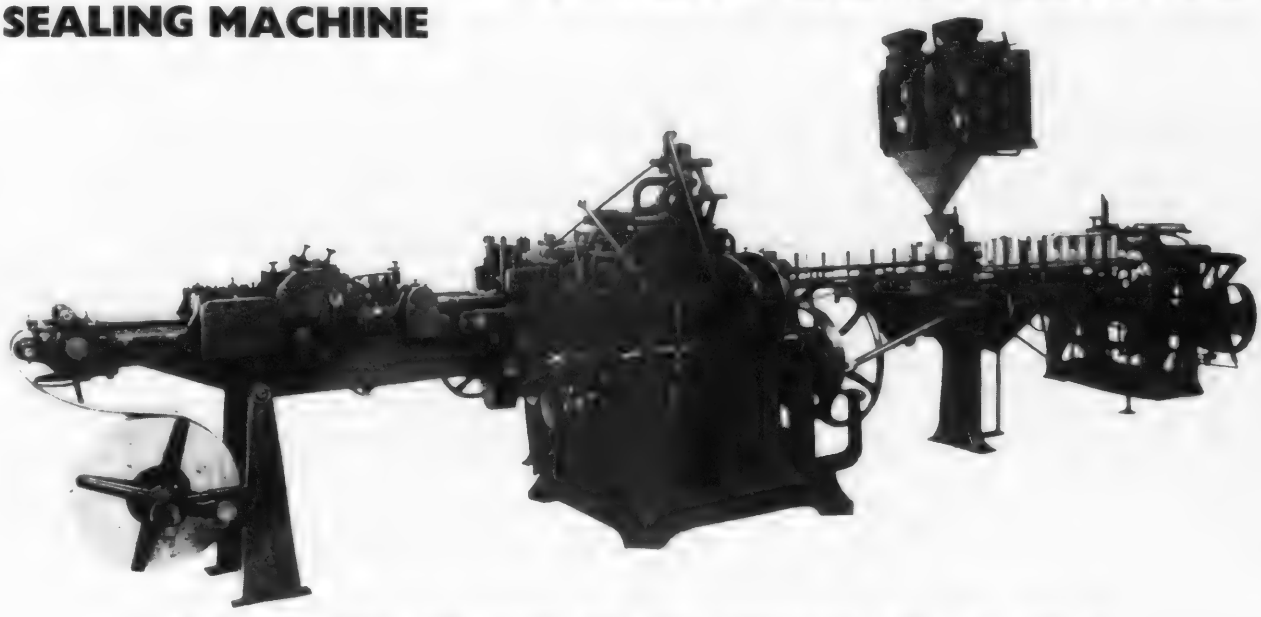

This machine forms a stout carton, lines it with powder-tight liner, fills, closes the inner bag inside carton, and securely seals the carton. Speed—60-70 per minute.

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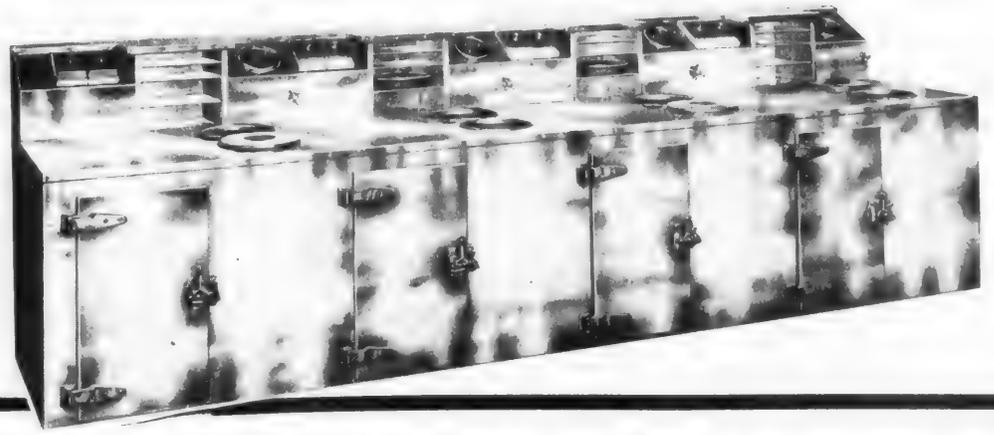

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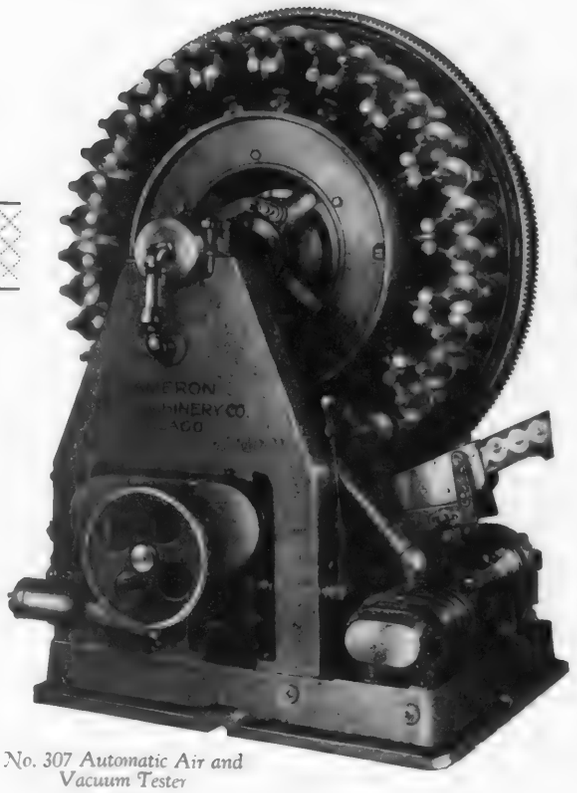

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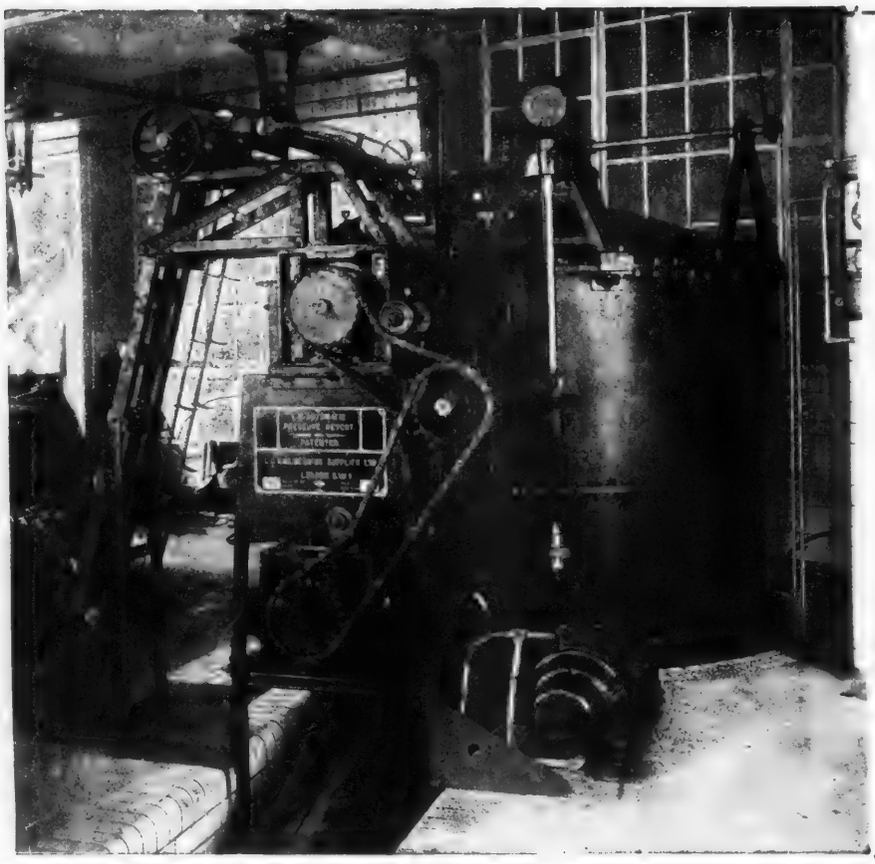

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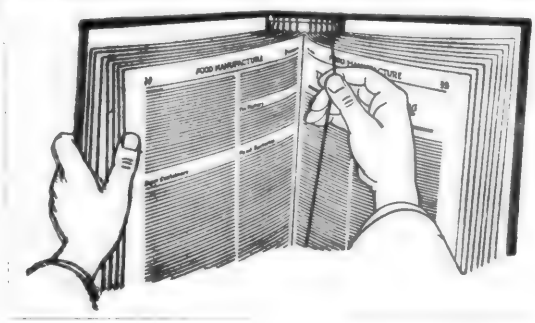

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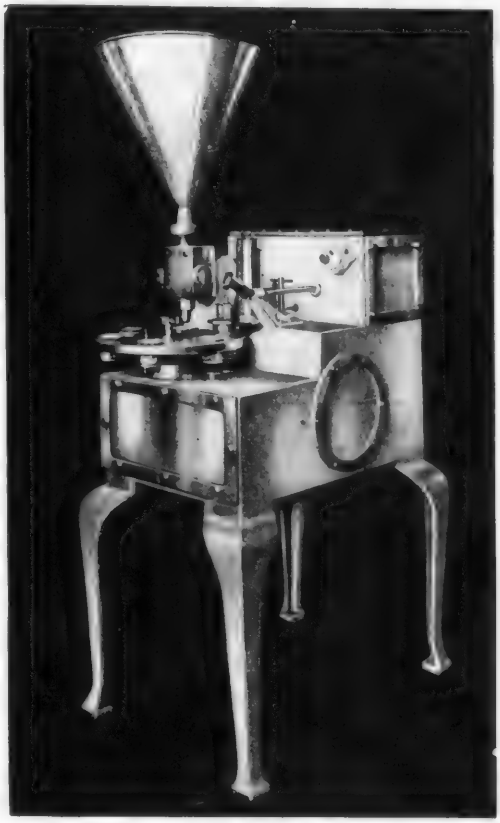

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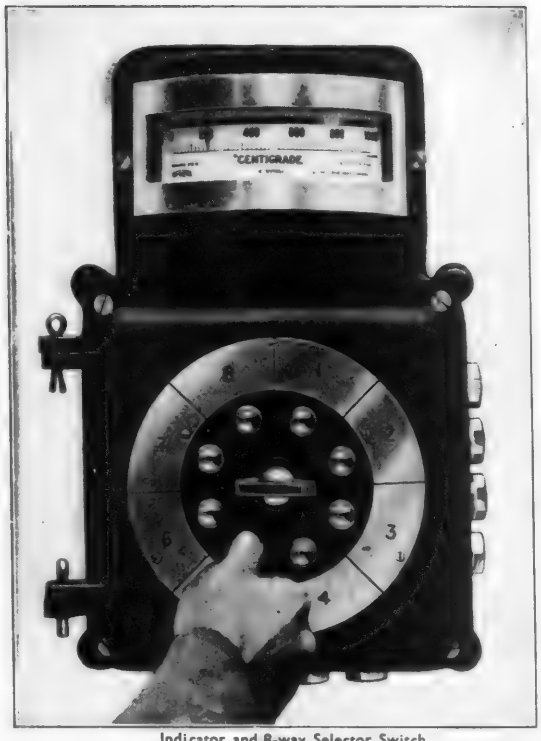

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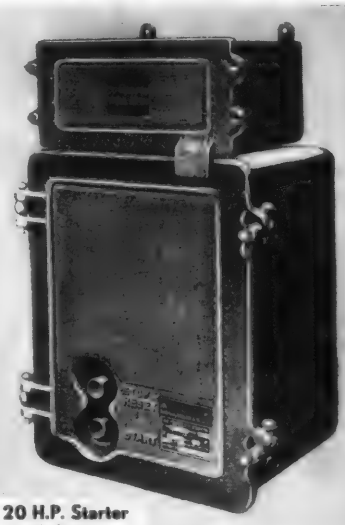
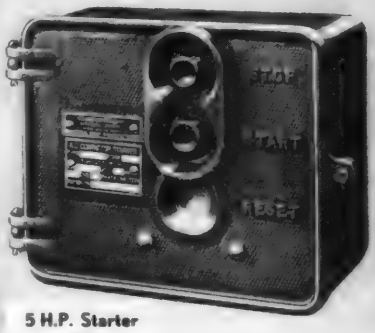
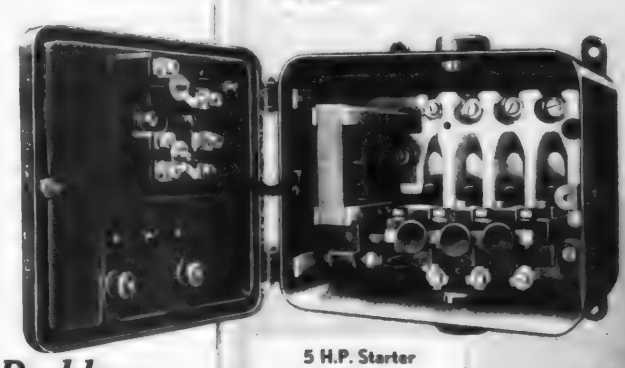


20 H.P. Starter with Isolator



5 H.P. Starter in cast iron case



5 H.P. Starter showing compact construction

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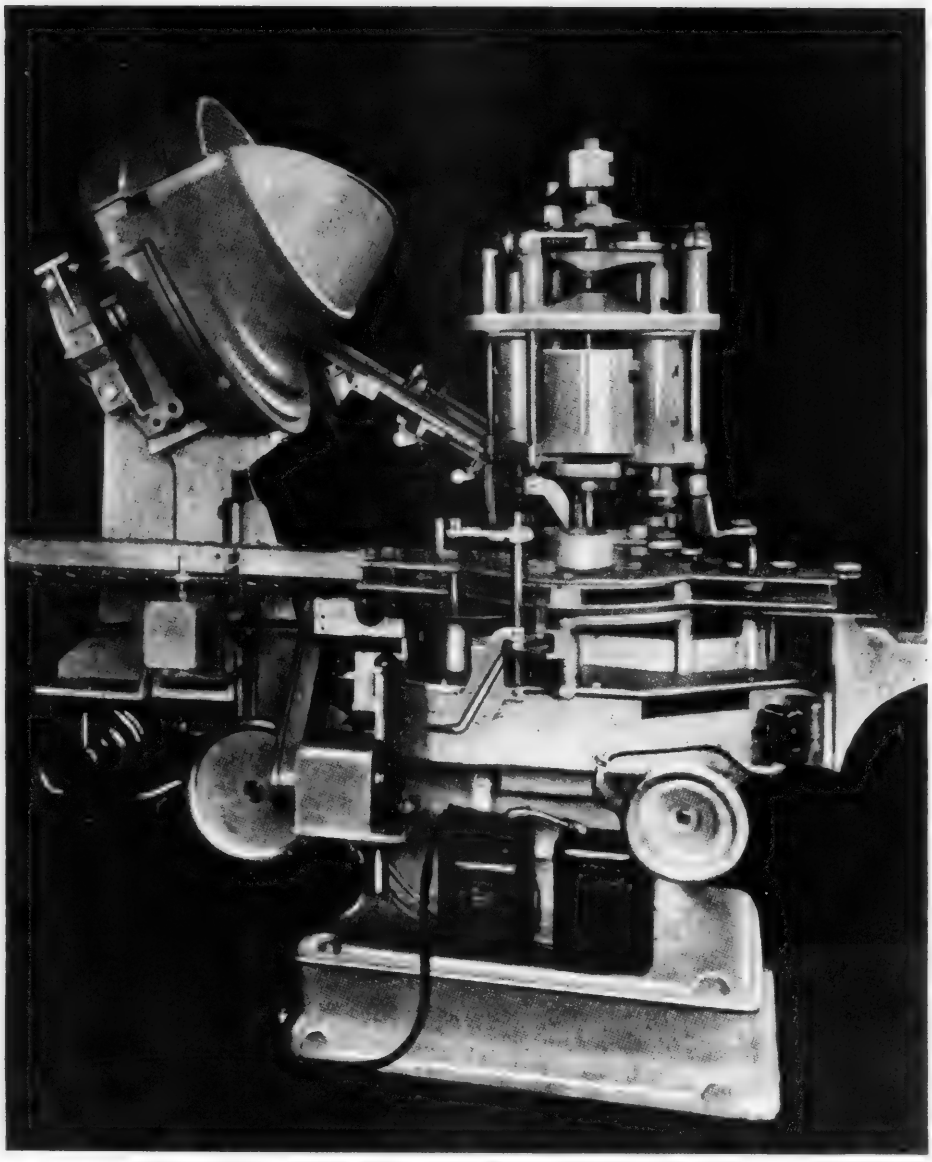

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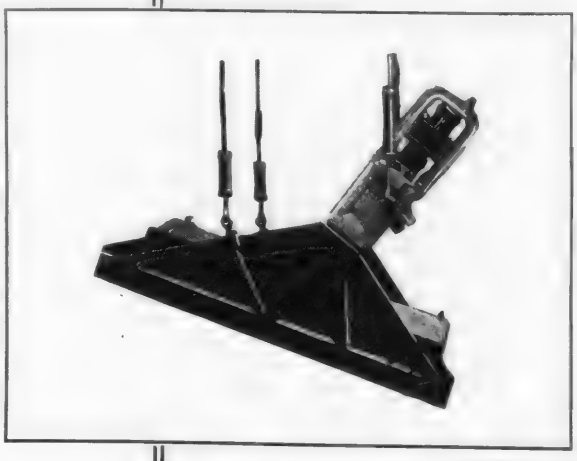

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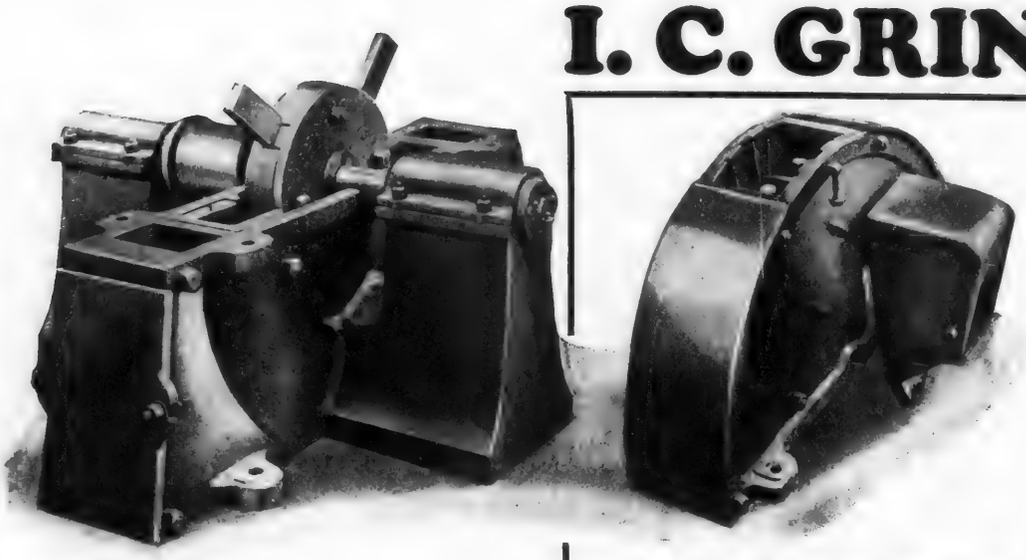
D.A. 85

I. C. GRINDER



● Illustration shows the I. C. Grinder, with casing removed.

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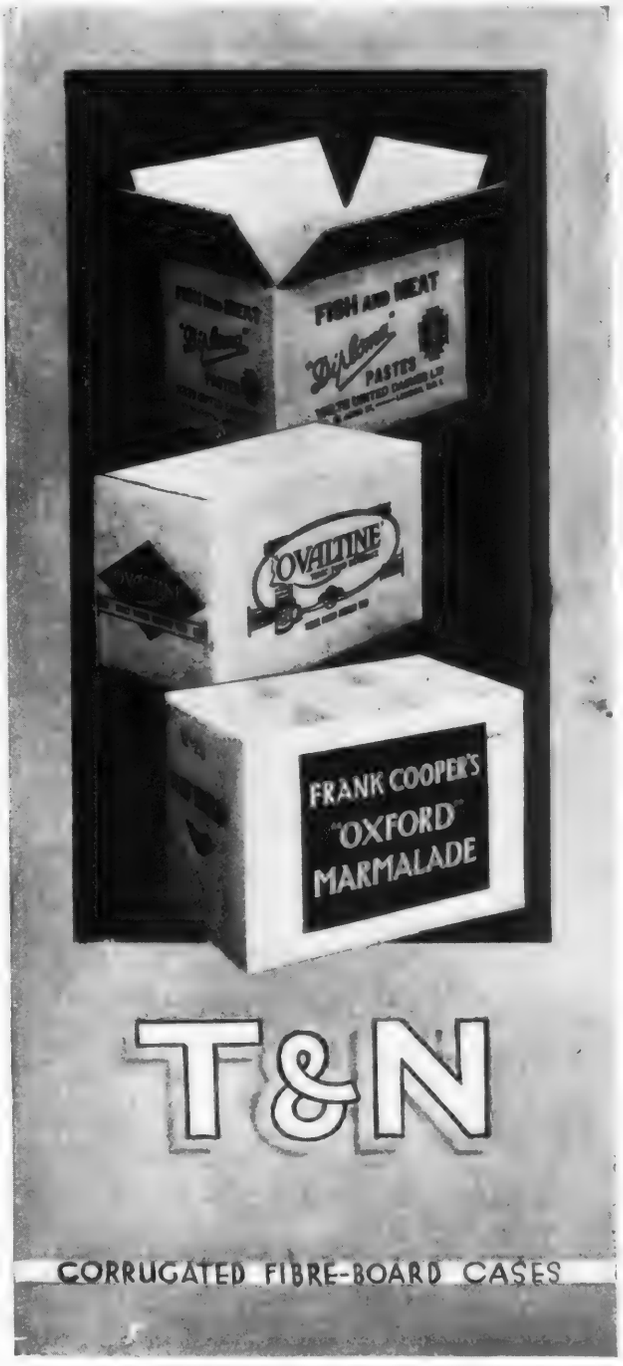

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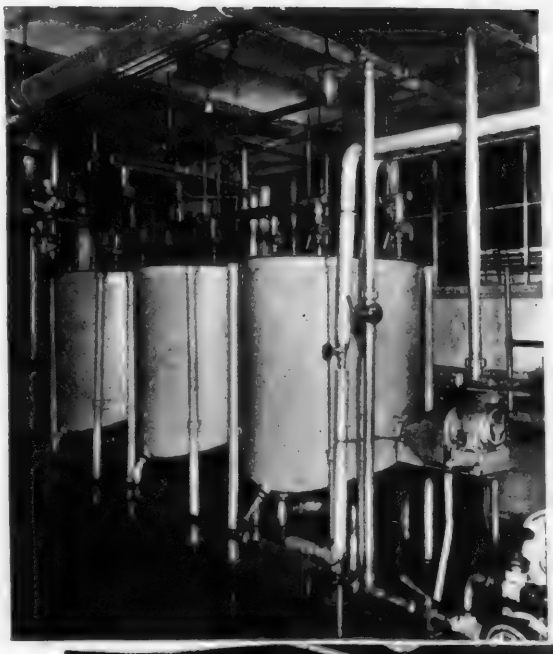
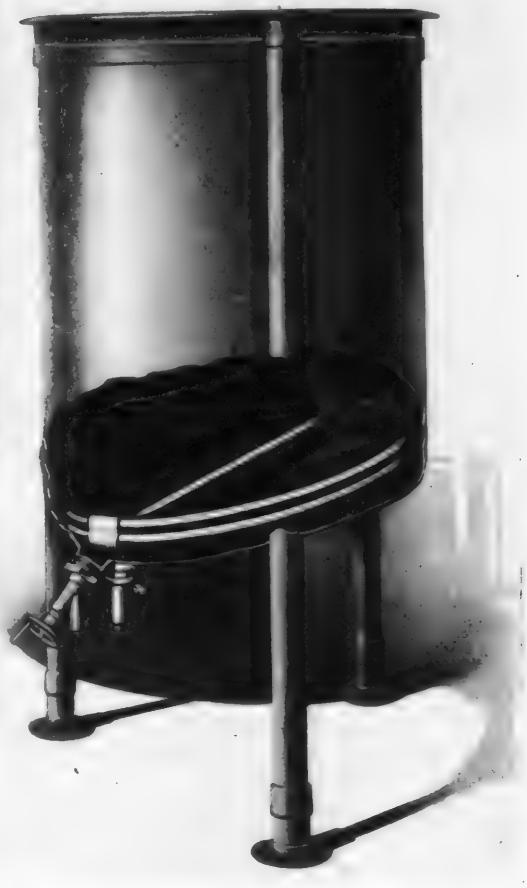


EVERYTHING matters that goes into the CAN

Many canners insist that their fruit and vegetable growers shall adhere to rigid requirements, and although this produce may be carefully handled in the factory, much less attention is often paid to the preparation of the necessary brine or syrup. Both are sensitive to chemical and bacteriological action, and tend to spoil flavour if allowed to become contaminated. This deterioration of flavour causes more loss of markets than any other factor.

Avoid Metallic Contamination by using a "Kwik-Mix"



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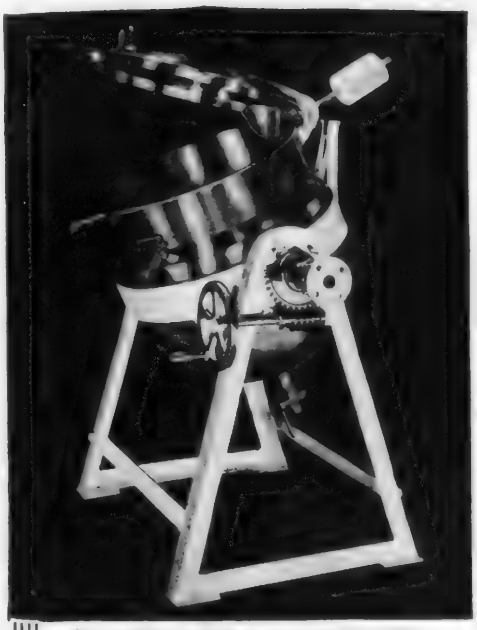

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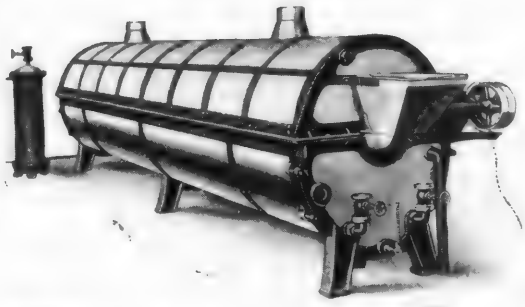

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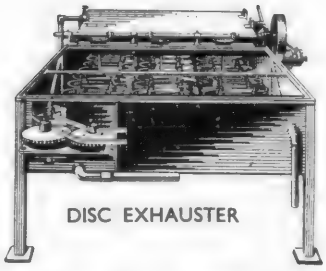

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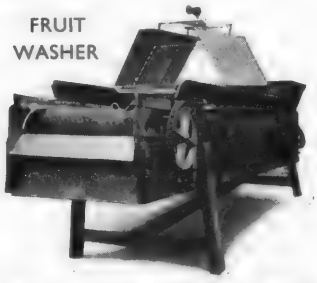

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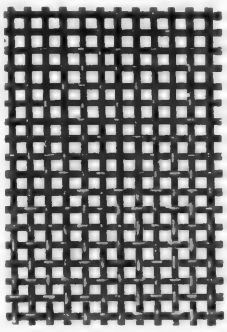

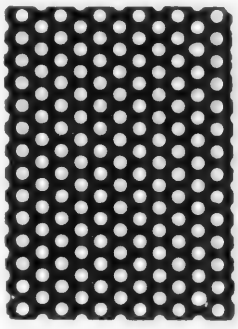

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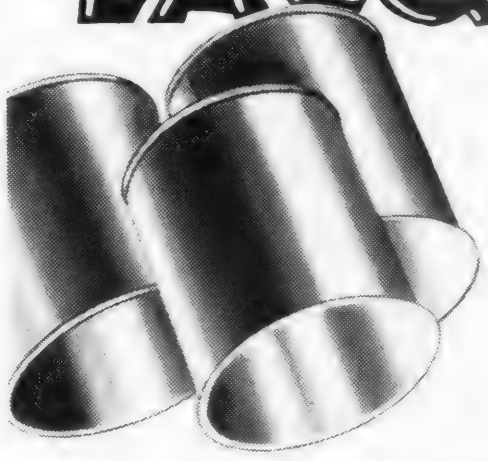

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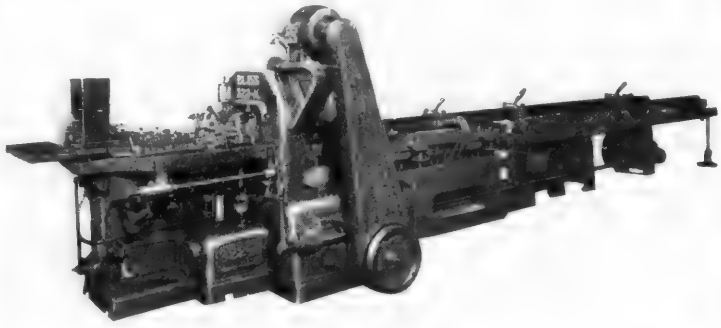

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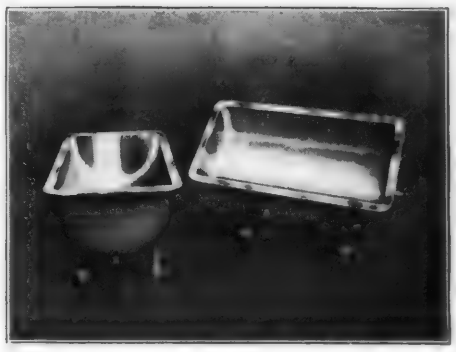

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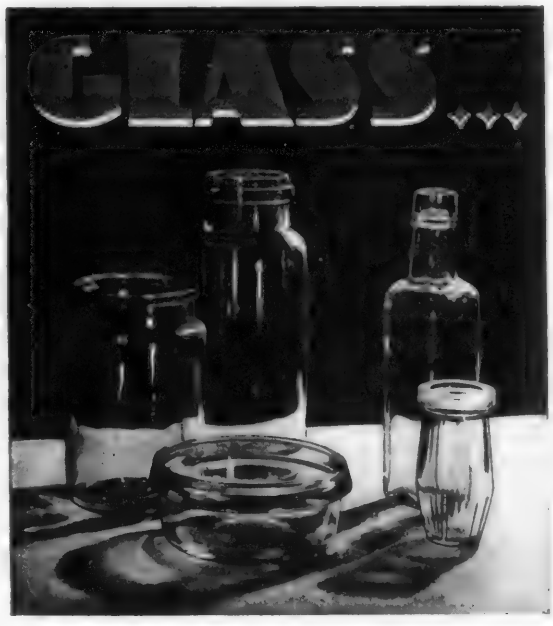

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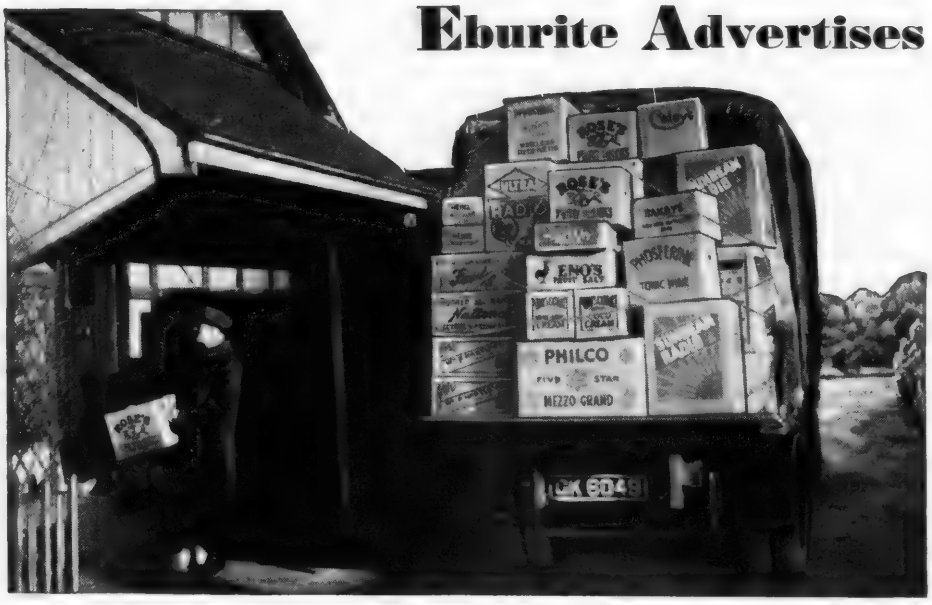

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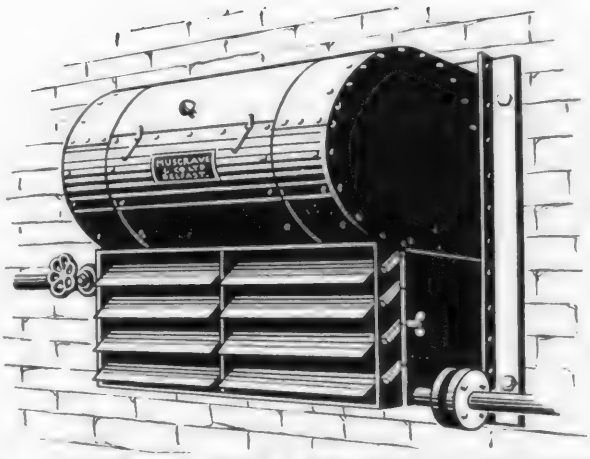

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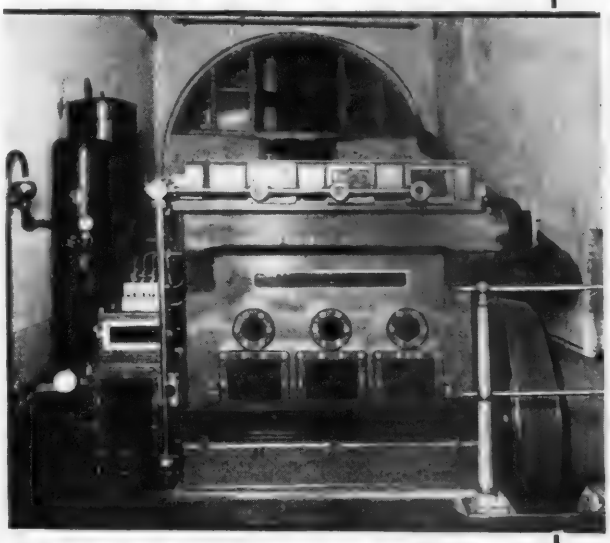

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Aversa,
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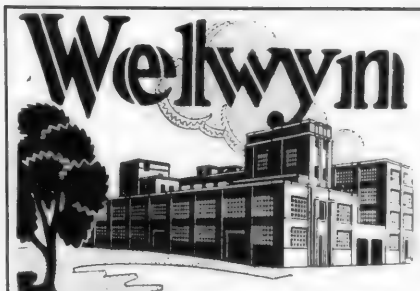

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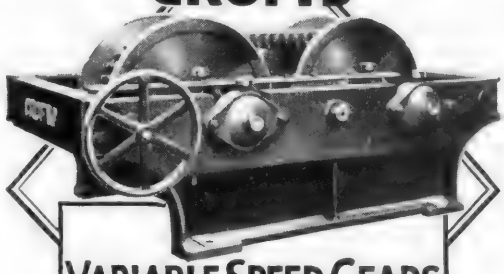

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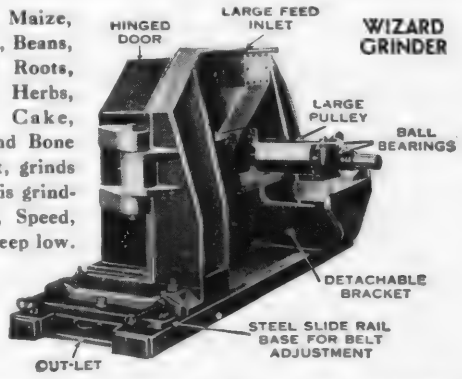

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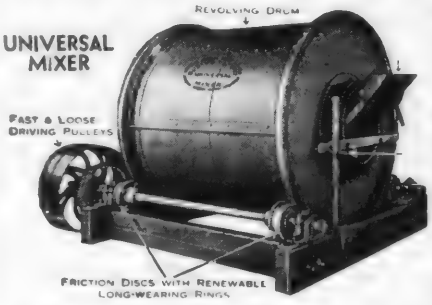

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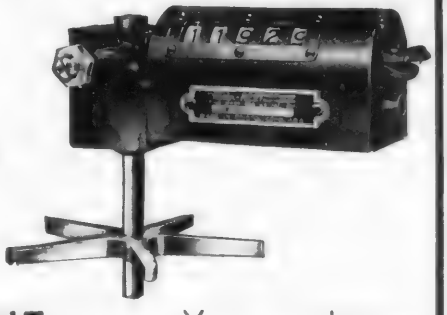

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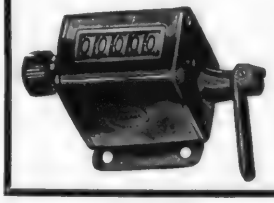

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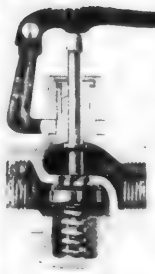

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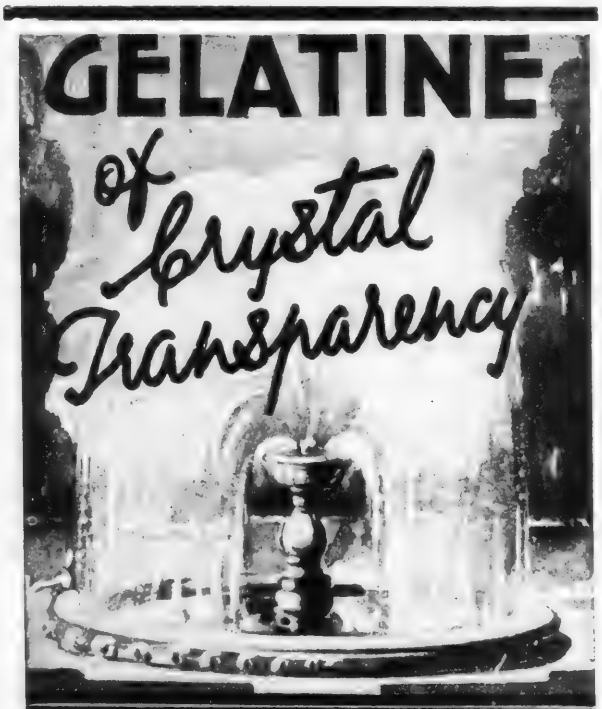

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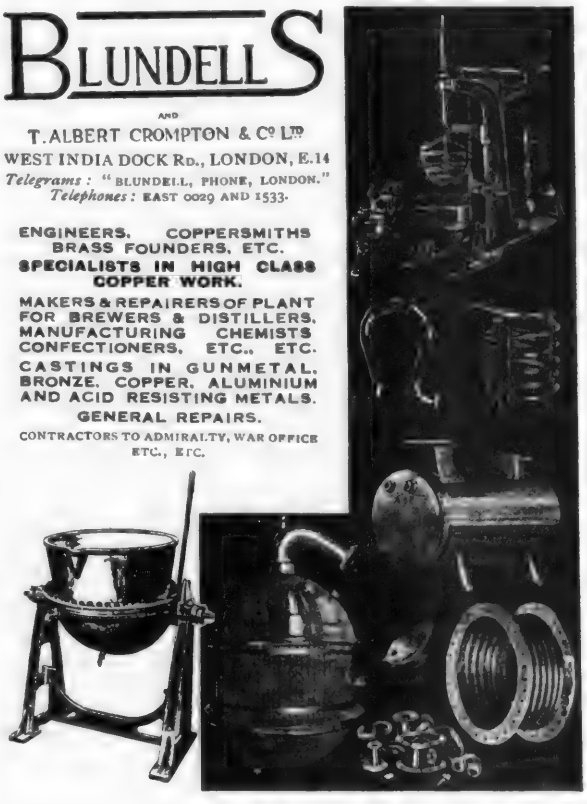

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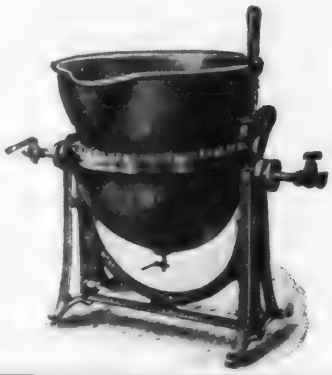

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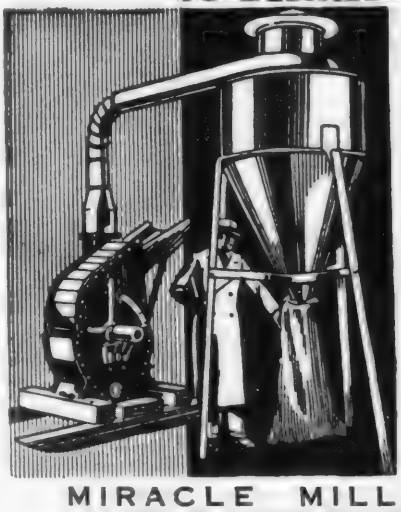

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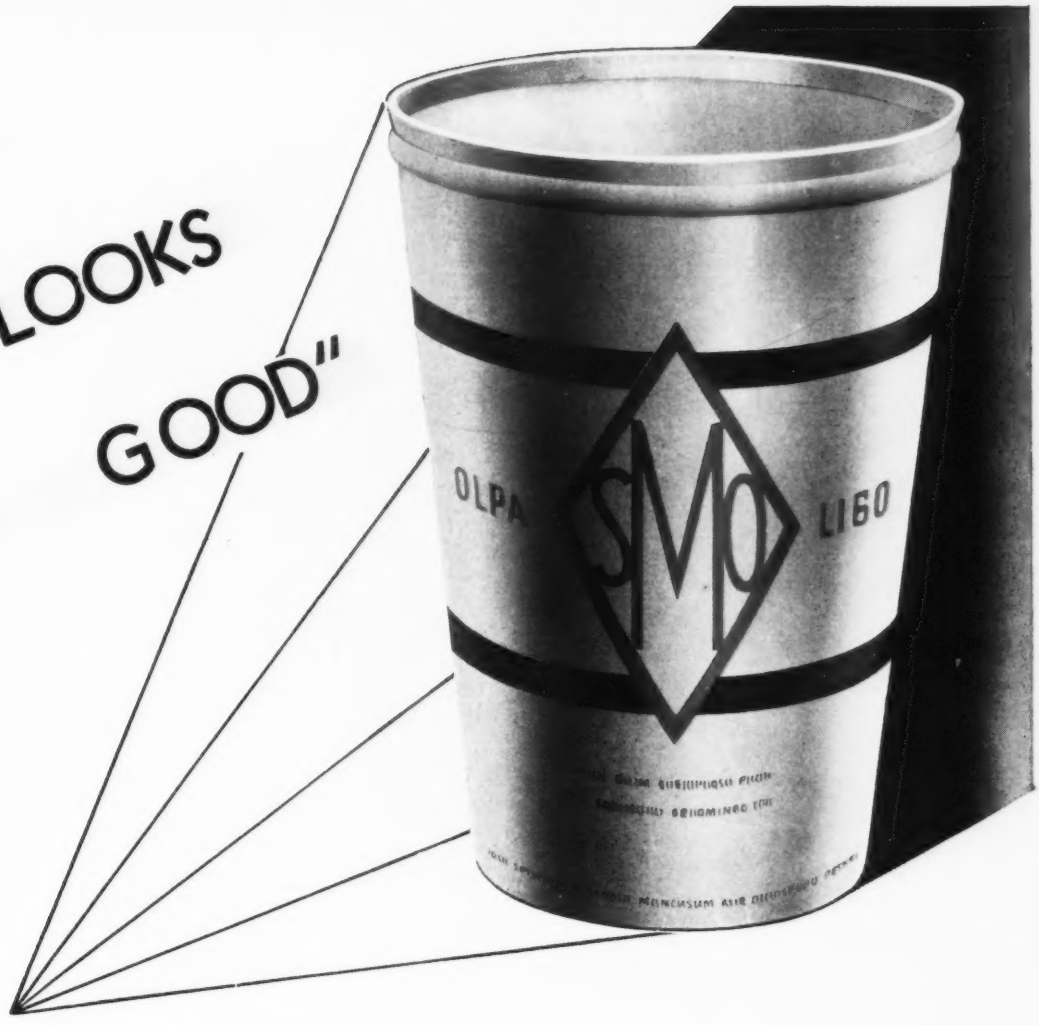

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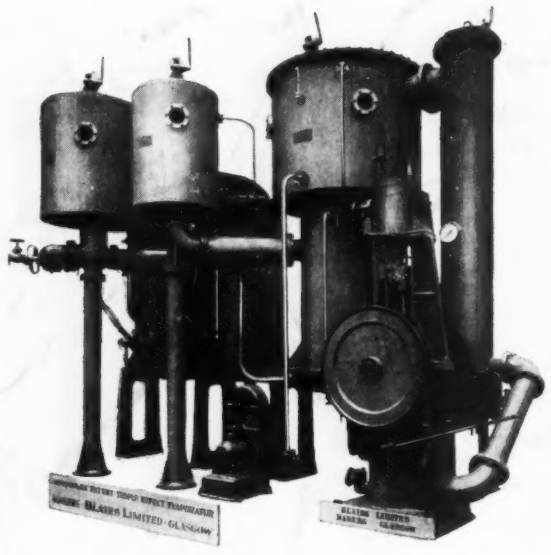

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